THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXXII. No. 2089.] LONDON, MAY 26, 1903. [55TH YEAR. PRICE 6d.

PARKER & LESTER,

— *ESTABLISHED 1830* —

MANUFACTURERS AND CONTRACTORS, **ORMSIDE STREET, LONDON, S.E.**

THE ONLY MAKERS OF

PATENT ANTIMONY PAINT & PARKER'S IMPERIAL BLACK VARNISH.

OXIDE PAINTS, OILS, AND GENERAL STORES, FOR GAS AND WATER WORKS.

SAFETY GAS-MAIN STOPPER,

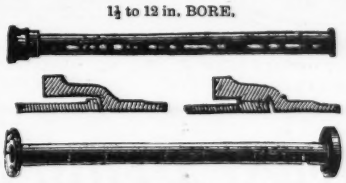
FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS.

GAS-LEAK INDICATOR.

PRICES AND PARTICULARS ON APPLICATION.

GAS AND WATER PIPES

1¼ to 12 in. BORE.



THOMAS ALLAN & SONS, LIMITED,

Bonlea Foundry,

THORNABY-ON-TEES.

Formerly Springbank Iron-Works, Glasgow.

ESTABLISHED 1848.

Also Manufacturers of

SANITARY & RAIN-WATER PIPES, HOT WATER PIPES STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.

Telegrams: "BONLEA, THORNABY-ON-TEES."

CARLESS, CAPEL & LEONARD,

HOPE CHEMICAL WORKS, HACKNEY WICK, LONDON, N.E.,

And at Pharos Works, Hackney Wick.

NAPHTHA AND GASOLINE DISTILLERS AND PETROLEUM IMPORTERS,

Specially distil Carburine Spirit, specific gravity ·680, or of any other grade suitable for Enriching Gas; also Gas Oil best adapted for injecting into the Retorts, as in the Herring Process.

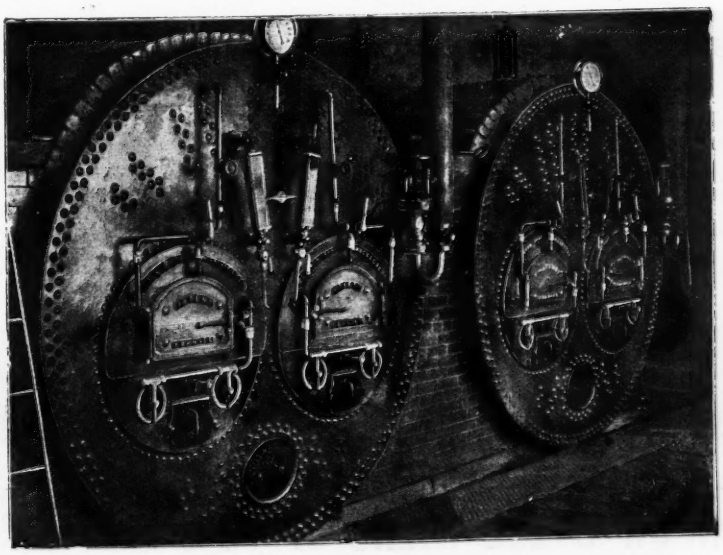
Importers of Petroleum for Carburetting Water Gas, or for Manufacturing Oil Gas. Distillers of Pentane, Petroleum Ether, and Naphtha for clearing the pipes of Naphthaline, &c.

Samples and Prices may be had on application.

THE "MELDRUM" BREEZE FURNACE.

More Steam.

Less Cost.



OVER

10,000

WORKING.

WRITE FOR CATALOGUE AN. TESTIMONIALS.

SUITABLE FOR ALL KINDS OF BOILERS, AND ALL KINDS OF FUEL.

FOR FULL PARTICULARS, ETC., APPLY TO

MELDRUM BROS., LTD., Atlantic Works, MANCHESTER; & 66, VICTORIA ST., LONDON, S.W.

JOSEPH EVANS & SONS, CULWELL WORKS, WOLVERHAMPTON.

Telegrams: "EVANS, WOLVERHAMPTON." London Address: Salisbury House London Wall, London, E.C. National Telephone No. 7089.

Please apply for Catalogue No. 8.

12,000 PUMPS IN STOCK AND PROGRESS.

TRADE MARK. LION EVANS WOLVERHAMPTON

Fig. 705. "SINGLE RAM" STEAM-PUMP.

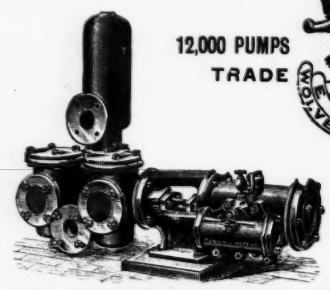


Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

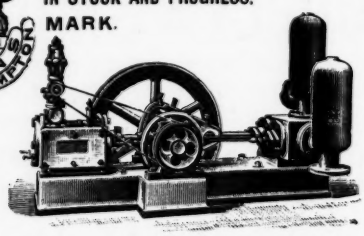


Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

Great Reduction in the Cost of Purifiers

LUTELESS PURIFIERS

WORKED WITHOUT ANY CONNECTIONS AT ALL

(RAMSDEN & SMITH'S PATENT, No. 12,034.)

No complicated arrangement of Valves, each requiring separate manipulation.

No Internal Pipes interfering with Purifying Area.

Every part easily accessible.

FOR PRICES AND ALL PARTICULARS, APPLY TO THE MAKERS:

EDWARD COCKEY & SONS, LD.

Engineers and Contractors for Gas Plant of every Description,

FROME, SOMERSET.

Telegrams: "COCKEYS, FROME." Telephone No. 16 FROME. Telegrams "DAMPER, LONDON."

London Office: BRIDGE HOUSE, 181, QUEEN VICTORIA STREET, E.C. Messrs. BALE & HARDY, Agents.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.

—11 MEDALS.—

JAMES RUSSELL & SONS LIMITED

CROWN TUBE WORKS. WEDNESBURY, ENGLAND.

MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

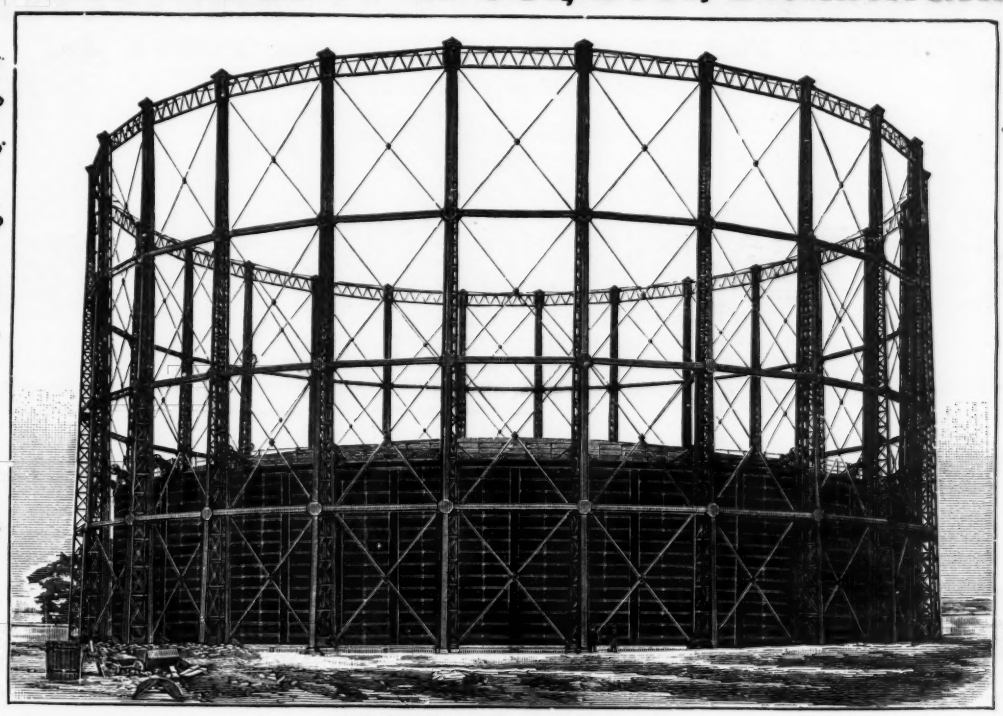
SCREWING TACKLE. BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 106, Southwark Street. MANCHESTER: 33, King Street West. BIRMINGHAM: 114, Colmore Row. LEEDS: 6, Mark Lane, New Briggate.

THOMAS PIGGOTT & CO., LTD., BIRMINGHAM.

LONDON OFFICE: ST. THOMAS APOSTLE, E.C.

GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT FITTINGS, ETC.



TELEGRAPHIC ADDRESS: ATLAS BIRMINGHAM

WELDED & RIVETED PIPES, FOUL MAINS, RETORT LIDS, WROT & CAST TANKS, PURIFIERS.

MANUFACTURERS OF

Humphreys & Glasgow's Patent Carburetted Water-Gas Plant.

INSTALLATIONS HAVE ALREADY BEEN ADOPTED WITH AN AGGREGATE CAPACITY OF 134,350,000 CUB. FT. DAILY.

J. & H. ROBUS, GAS AND WATER ENGINEERS, LONDON,

LONDON, *20, Bucklersbury. Telegraphic Address: "Robustness." Telephone: 756 Bank.*

GORING. ,, ,, *"Water."*

THE MOST ECONOMICAL AND BEST

RETORT SETTINGS

INCLINED. REGENERATIVE.

FLOOR LINE. GASHOLDERS AND TANKS.

ON THE MARKET

ROBUS!

BOREHOLES. RESERVOIRS.

WELLS AND EVERY REQUISITE.

Gas & Water Works Erected.

THE WIGAN COAL & IRON CO., LIMTD.,

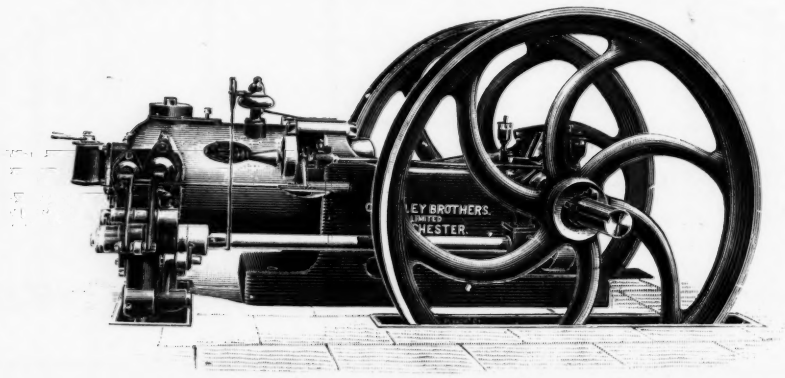
Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND AND WEST OF ENGLAND DISTRICT OFFICE: *6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.*
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone No. 200.

LONDON DISTRICT OFFICE: *6, STRAND, LONDON—C. PARKER & SON, Sole Agents.*
Telegraphic Address: "PARKER, LONDON."

CROSSLEY'S GAS-ENGINES

SUITABLE FOR DRIVING EXHAUSTERS, PUMPS, &c.



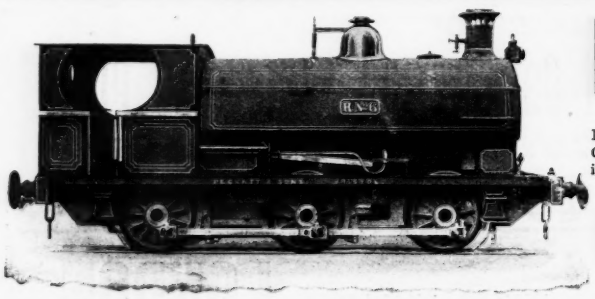
Represents "XA" Type giving 60 Effective Horse Power.

ENGINES DELIVERED – Up to the end of 1902, 46,150 Engines have been delivered representing 648,421 B. HP.

IMMEDIATE DELIVERY FOR STOCK SIZES OF ENGINES.

Large Number of Second-Hand Engines always in Stock.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER.



LOCOMOTIVES

LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in Stock, ready for immediate Delivery.

Photographs, Specifications, and Prices on Application.

PECKETT & SONS, Atlas Locomotive Works, BRISTOL.

Telegraphic Address: "PECKETT, BRISTOL."

NEWTON, CHAMBERS, & CO.,

LIMITED,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

Established 1790

LONDON OFFICE: **19, Great George Street, WESTMINSTER.**

Telegraphic Addresses: "NEWTON, SHEFFIELD," "ACCOLADE, LONDON."

GAS ENGINEERS IRONFOUNDERS & CONTRACTORS.

MANUFACTURERS OF EVERY DESCRIPTION OF

PLANT. APPARATUS, AND MACHINERY FOR GAS AND CHEMICAL WORKS,
RETORTS AND FITTINGS, MOUTHPIECES WITH SELF-SEALING LIDS.
IMPROVED COAL AND COKE HANDLING PLANT, CONVEYORS AND ELEVATORS,
CONDENSERS, SCRUBBERS AND WASHERS.

PURIFIERS with Planed Joints a Speciality.

PATENT CENTRE-VALVES, RACK AND SCREW VALVES, WOOD GRIDS, AND
SCRUBBER-BOARDS, CAST-IRON MAINS, AND SPECIALS.
STRUCTURAL WORK, COLUMNS, GIRDERS, AND ROOFING.
GASHOLDERS CAST-IRON OR STEEL TANKS.

DESIGNS, SPECIFICATIONS, and ESTIMATES FREE.

PIG IRON (SPECIAL QUALITY) for Engine Cylinders. GAS COAL famous for its unrivalled excellence.

ALBION IRON WORKS,
MILES PLATTING,
MANCHESTER.
TELEGRAMS—
"STOKER, MANCHESTER."

WEST'S GAS IMPROVEMENT CO., LD.,

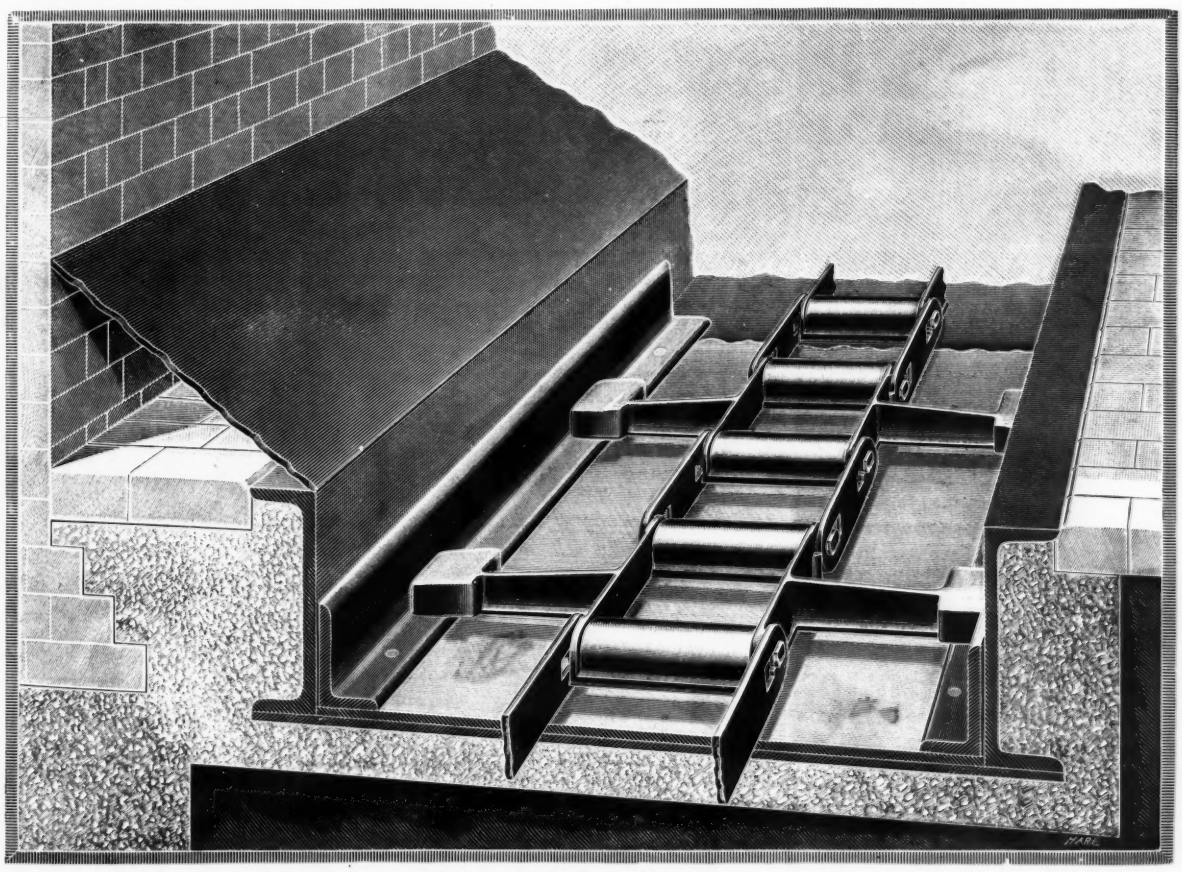
Gas and General Engineers.

CONTRACTORS FOR

COMPLETE RETORT-HOUSE PLANT

. . . EITHER ON . . .

THE HORIZONTAL OR INCLINED SYSTEMS.



SECTION OF

WEST'S IMPROVED PATENT HOT-COKE CONVEYOR,

With Special Chain constructed with a minimum number of parts, and having Large Joint Pins with ample Bearing Surfaces.

WEST'S STOKING MACHINERY— COMPRESSED AIR DRIVEN AND MANUAL SYSTEMS.

COAL BREAKING, ELEVATING, & STORING PLANTS.

BELTON'S PATENT AUTOMATIC RELIEF APPARATUS FOR HYDRAULIC MAINS.

Manufacturers for America: Riter-Conley Manufacturing Company, Pittsburg.

SAML. CUTLER & SONS. MILLWALL, LONDON.

GASHOLDERS OF EVERY DESCRIPTION.

CUTLER'S PATENT GUIDE FRAME FOR GASHOLDERS

Adopted for many large and important Gasholders.

CUTLER'S PATENT FREEZING PREVENTER

FOR GASHOLDER CUPS AND TANKS.

In extensive use in English, Continental, and American Works.

LARGE STEEL TANKS A SPECIALITY

Gasworks Plant of every kind.

STEEL FRAMED BUILDINGS.

RETORT-HOUSE ROOFS. BENCH IRONWORK.

CARBURETTED WATER GAS PLANT.

CUTLER'S PATENT INTERLOCKING GEARS.
CUTLER'S PATENT OIL SPRAYERS.
CUTLER'S PATENT TAR SEPARATOR.
CUTLER'S PATENT DUST INTERCEPTOR.

PATENT WATER TUBE CONDENSERS

OIL-TANKS. CHEMICAL PLANT.

Makers of all kinds of Constructional Ironwork.

GREAT SAVING IN FUEL

"AVERY SIMPLE & INGENIOUS APPARATUS."—
VIDE "THE ENGINEER" NOV 12TH 1897

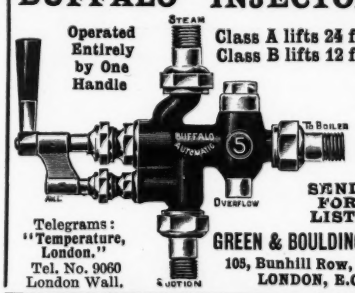
SOLE LICENSEES:

WALLACH BROTHERS.

57 GRACECHURCH ST LONDON.E.C

The "Evertrusty" Draught Indicator, also known as **Jensen's Flutometer** (Regd. Trade Mark), Should be fixed to every boiler flue, coke-oven, retort, &c., to reduce your Coal Bill. Clear indication of variation of draught pressure obtained. Agents Wanted.

'BUFFALO' INJECTOR



Operated Entirely by One Handle

Class A lifts 24 ft.
Class B lifts 12 ft.

SEND FOR LIST.

Telegrams: "Temperature, London." Tel. No. 9060 London Wall.

GREEN & BOULDING, 105, Bunhill Row, LONDON, E.C.

THE

"ROTARY" STATION METER.

Efficiency Demonstrated.

APPLY—

T. G. MARSH,
MAWSON CHAMBERS, DEANSGATE, MANCHESTER.

WELDON MUD

FOR

GAS PURIFICATION,

For use in the

RECOVERY OF SULPHUR,

Also Removal of last Traces of

SULPHURETTED HYDROGEN

in catch position.

Full Particulars on application to the Patentees

GAS DESULPHURIZATION CO.,

— LIMITED, —

1, FENCHURCH AVENUE, LONDON, E.C.

TROTTER, HAINES, & CORBETT,

Brettell's Estate LIMITED,

FIRE-CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 84, OLD BROAD STREET, E.C.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY

RAVENSTHORPE, NEAR DEWSBURY.

Asbestos

If you want a first-class

LOW OR HIGH PRESSURE PACKING

FOR

STEAM OR HYDRAULIC

purposes drop us a card for samples.

Ask for No. 1 Catalogue.

Applications for Colonial & Foreign Agencies invited.

CRESSWELL'S ASBESTOS CO., LTD.,
Wellington Mills, BRADFORD, Yorks.
Telephone 950. Telegrams: "Asbestos, Bradford."

THE PATENT

"BEACON" GLOBE LAMP,

Largely adopted by many Local Authorities for Public Lighting, being absolutely Shadowless and Wind-proof.

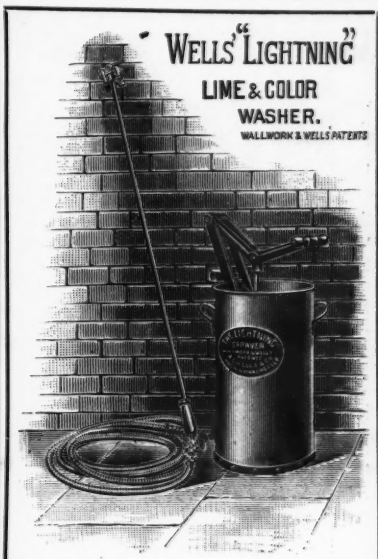
H. GREENE & SONS, Limited,

Surrey Engineering Works,

Blackfriars Road, LONDON.

Telephone 1698 HOP.

Telegrams: "LUMINOSITY LONDON."



Great Saving of Time, Labour, and Money.

NO OUTSIDE POWER REQUIRED.

SAVES ITS COST IN A FEW DAYS.

Lime, Whiting, or Cold Water Paints,

Applied at a speed of from 10 to 20 square yards per minute, in a manner superior to brushwork. One coat with the machine on rough surfaces is equal to two applied with brushes.

No. 6, handy pattern, without Tank	£7 7
No. 4	£8 10
No. 4A, on Wheels	£10 10
No. 5, large size	£10 10

TESTIMONIALS recently received:—

"We have made an exhaustive personal trial of your machine, and consider it a fine labour-saving invention."

We consider it does as much in an hour as a man can do in a day."

WELLS' "LIGHTNING" PAINTER

(WALLWORK & WELLS' PATENTS.)

OVER 500 SOLD.

Painting Speed—3 Square Yards a Minute.

No. 1	Painter .	£25	Single Air Compressor	£17	10
No. 2	,, .	£30			
No. 3	,, .	£35	Double ditto .	£27	0

Vertical Steam-Engine and Air-Compressor combined with lagged Boiler on Wheel Base £104

As supplied to the following—

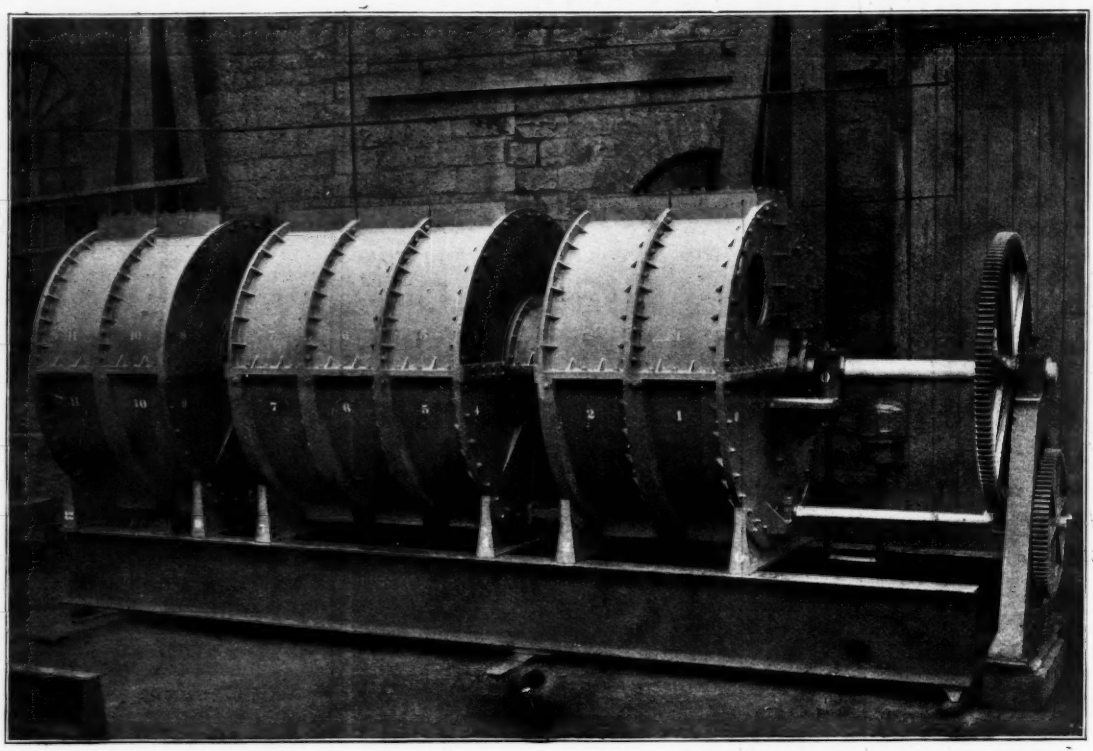
The Gaslight and Coke Company, the South Metropolitan Gas Company, the Glasgow, Edinburgh and Leith, Birmingham, Preston, Burslem, Warrington, Liverpool, Nottingham, Oldham, Stockport, and West Bromwich Corporation Gas-Works, &c.

A. C. WELLS & CO. 113, Midland Rd., St. Pancras, **LONDON.**

Works: CHEETHAM, MANCHESTER.

KIRKHAM, HULETT, & CHANDLER, LTD., PALACE CHAMBERS, BRIDGE ST., WESTMINSTER, S.W.

Extracts ALL the Ammonia and large proportion of CO_2 and H_2S.



Maximum Washing Surface. Easy access to interior.

IMPROVED PATENT "STANDARD" WASHER-SCRUBBER.

PHOTO. OF MACHINE ERECTED IN YARD PRIOR TO DELIVERY.

Telegraphic Address: "WASHER, LONDON."

Telephone No. 103. Telegraphic Address: "ELEVATOR, HASLINGDEN."

S. S. STOTT & CO.,

ENGINEERS, HASLINGDEN, NR. MANCHESTER.

COAL AND COKE ELEVATORS & CONVEYORS.

COAL AND COKE STORAGE PLANTS.

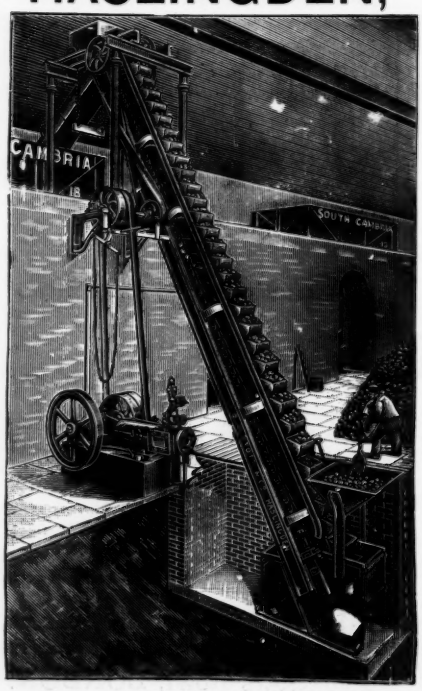
COAL AND COKE BREAKERS.

WHARF ELEVATORS FOR UNLOADING BARGES.

ELEVATORS & CONVEYORS for BOILER-HOUSES.

STAMPED AND RIVETED STEEL ELEVATOR BUCKETS.

DETACHABLE CHAINS AND SPROCKET WHEELS.



Coke Elevator Loading Railway Waggons.

LIME AND OXIDE ELEVATORS & CONVEYORS.

HIGH-CLASS STEAM-ENGINES up to 1000-Horse Power.

PUMPS, HORIZONTAL AND VERTICAL, SINGLE, DOUBLE, or THREE-THROW, for WATER-WORKS, &c.

BEAM PUMPING-ENGINES.

AIR-COMPRESSORS.

BELT PULLEYS, ROPE PULLEYS, GEARING, &c., &c.

WHEN Sales of an article increase,
It is a sign of its increasing popularity.

Sales of "**ACME**" Gas Cookers
are rapidly increasing.

A sure sign the public
like the "**ACME.**"

Is the "**ACME**" on your Hire list?

THE **WHESSOE**

FOUNDRY CO., LTD.

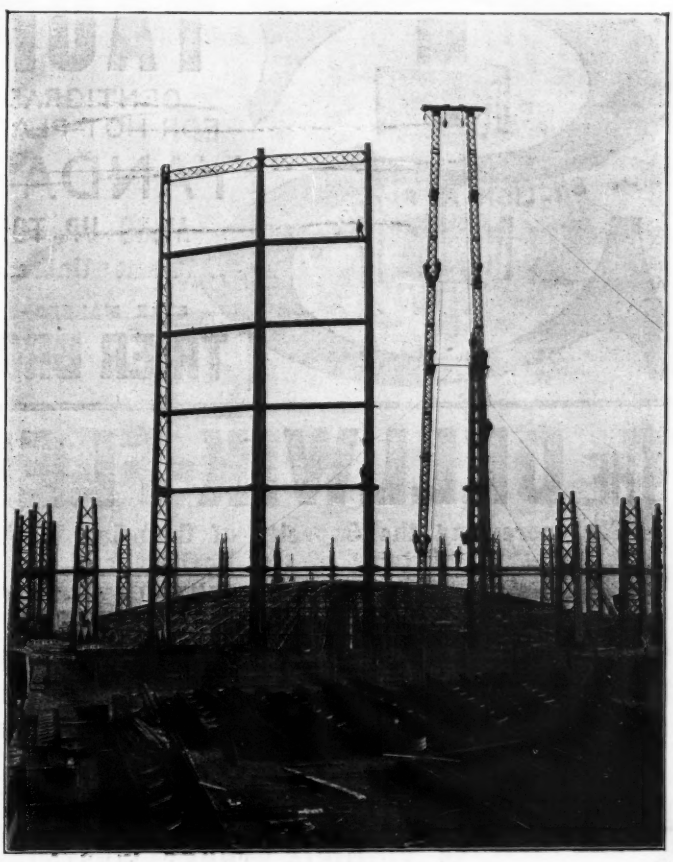
Works: DARLINGTON.

London Office: 106 CANNON STREET, E.C.

MAKERS OF

EVERY DESCRIPTION OF

GAS PLANT.



PHOTOGRAPH OF THREE-LIFT HOLDER

FOR

NEWCASTLE AND GATESHEAD GAS CO.

TAKEN DURING ERECTION.

CAPACITY 6 MILLION CUB. FT.

DIA. 236 FEET. HEIGHT 133 FEET.

HENRY BALFOUR & CO.

LIMITED,

LEVEN, FIFESHIRE.

Contractors for the Supply and Erection of all Classes of

Gas-Works Plant.

THE "ANNULAR" BRUSH WASHER-SCRUBBER

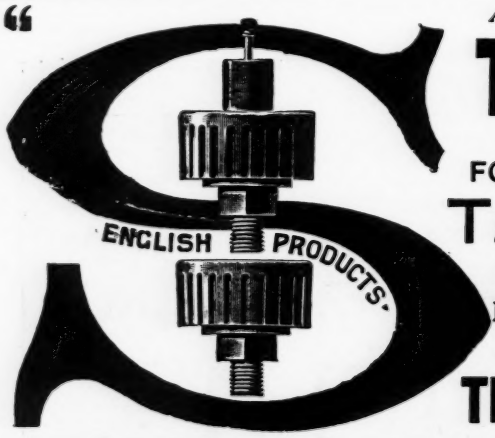
(CREEKE'S PATENT).

Made with Cast-Iron or Mild Steel Cylinders.

PRICES AND PARTICULARS ON APPLICATION.

London Representative: **MR. HENRY PUPLETT, 47, VICTORIA STREET, S.W.**

"



A BOON TO MASTER, MAN, and MACHINE.

TAUFFER'S REG. TRADE MARK.

CENTIGRADE FOR HOT PLACES **LUBRICANT"**

TANDARD MACHINE GREASE.

AVING UP TO **90** PER CENT. OVER LIQUID OIL.

Patent "Unbreakable" & "Telltale" Stauffer Lubricators.

SOLE MAKERS—

TRIER BROS., 1, GT. GEORGE ST., WESTMINSTER, LONDON.

CUMBERLAND WORKS, NEW CHURCH RD., CAMBERWELL.

THE DELLWIK-FLEISCHER WATER-GAS PROCESS

For Increasing the Capacity of Coal-Gas Works, also for Incandescent Lighting, Driving of Gas-Engines, and Manufacturing Purposes.

(PATENTS IN ALL COUNTRIES)

THIS PROCESS HAS BEEN ADOPTED AT THE FOLLOWING GAS-WORKS:—

IN ENGLAND: WEST BROMWICH, ILFORD, TIPTON, CLEETHORPES, BILSTON.

ON THE CONTINENT: KÖNIGSBERG, ERFURT, ISERLOHN, REMSCHEID, PFORTZHEIM, PLAUEN, BARMEN-RITTERSHAUSEN, NUREMBERG, MÜLHEIM A/RUHR, LUDWIGSHAFEN a/R., GÜSTROW, BERNE, LYONS, GIJON, ROME, ARNHEIM, BRUMMEN,* OSTERFELD,* WARSTEIN,* WIBORG.*

[* Blue Water Gas with Incandescent Burners.]

ALSO FORTY INSTALLATIONS FOR MANUFACTURING PURPOSES.

THE DELLWIK-FLEISCHER WATER-GAS SYNDICATE,

25, VICTORIA STREET, WESTMINSTER, LONDON, S.W.

CONTENTS.

EDITORIAL NOTES.

GAS, LIGHTING, &c.—

Meeting of the Institution of Gas Engineers 501
The Ownership of Gas Undertakings . . 501
The Beginning of Reform in Manchester Gas Polity 502
The Hard Case of the Crewe Gas-Mains . 503
The Writing of Decimals—A Caution to Authors of Technical Papers 503
A Good Year at Birmingham—The Sleeping Partner — Obstructing the Welsbach Capital Reorganization — Prepayment Meter Law—American Methods of Enhancing the Usefulness of District Gas Managers' Associations. 503

WATER AFFAIRS—

Officering the Metropolitan Water Board . 505
A Prosperous Water Company 505

ESSAYS AND REVIEWS.

The Decisions of Sir John Brunner's Committee 506
For and Against Municipal Gas Supply . . 507
The New Parisian Retort-Charging Machine —Some Supplementary Points 508
The Present and Future of the Hastings Gas-Works. 510
The Comparative Life of Horizontal and Inclined Retorts 513
The Granton Works of the Edinburgh and Leith Gas Commissioners. 514
Electric Lighting Memoranda 516
Gas and Water Stock Market 516

TECHNICAL RECORD.

Midland Association of Gas Managers—Excursion Meeting at Rugby. 517
Manchester District Institution of Gas Engineers—Excursion Meeting at Sheffield. . 520
Ohio Gaslight Association 521
Typical Installations of the De Brouwer Retort-Charger 523
German Association of Gas and Water Engineers—Programme of the Annual Meeting 524
Société Technique du Gaz en France—Papers at the Annual Congress at Toulon—
Canioni's Self-Lighting Burners 524
Purification Questions 525

REGISTER OF PATENTS.

Retort-Charging Apparatus—Pfeiffer, A. . . 526
Charging Inclined Retorts—Herring, W. R. . 526
Incandescent Mantles—Schottmann, F. C. . 526
Regenerative Furnaces—Graham, M. . . . 526
Coin-Freed Meters—Glover, T. 527
Burners and Lanterns for Incandescent Gas Lighting—Holgate, T. 527

CORRESPONDENCE.

The Price of Gas for Power Purposes . . . 528
The Law and Practice Relating to Test Gas-Burners 528

PARLIAMENTARY INTELLIGENCE.

Progress of Bills 528
Gleanings from the Committee Rooms . . 528
London and North-Western Railway Bill—The Breaking-Up of Streets 529
Derby Gas Bill. 530
Electric Lighting in Willesden 530

MISCELLANEOUS NEWS.

Welsbach Capital Reorganization 530
The London County Council and the Gaslight and Coke Company—The Recent Settlement 531
Gas Affairs at Manchester 532
Birmingham Gas, Water, and Electricity Supplies 533
Halifax Gas-Works Extensions. 534
Heywood Corporation Gas Supply—The Engineer's Report 534
Stock and Share List 534
Public Lighting in Edinburgh 535
Students at the Smethwick Gas-Works . . 535
Meters Limited 536
Electric Lighting Notes 536
West Middlesex Water-Works Company . . 537
Metropolitan Water Board 538
Water Profits at Walmer. 538
Bude and Stratton Water Supply 539
Notes from Scotland 539
Current Sales of Gas Products 540
Coal Trade Reports 541

PARAGRAPHS.

International Committee on Photometry . . 505
Electrolysis of Water-Pipes—Lighting Small Towns by Acetylene 509
Personal and Obituary 517
"Water Companies' Accounts" 522
Malta and Mediterranean Gas Company . . 527
Gas Profits and Electricity Losses at Devonport—Colne Gas Supply 528
South African Lighting Association, Limited 532
Southport Water Board—London County Council and Gas Testing—Reductions in Price—Southwold Gas Company. . . . 542
Gas and Water Profits at Carlisle 543

Messrs. HUMPHREYS & GLASGOW

AND

THE UNITED GAS IMPROVEMENT CO., U.S.A.

CARBURETTED WATER-GAS PLANT

— *DOUBLE SUPERHEATER SYSTEM.* —

H. & G., LONDON **134,350,000** Cu. Ft. Daily

U. G. I. CO., U.S.A. **364,700,000** Cu. Ft. Daily

TOTAL 499,050,000 Cu. Ft. Daily

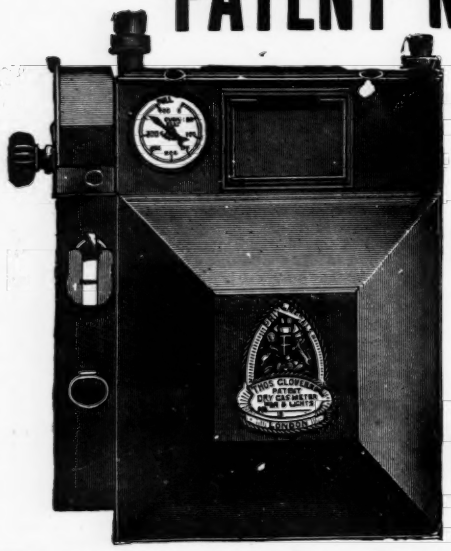
Messrs. HUMPHREYS & GLASGOW,
38, Victoria Street, London, S.W.
31, Nassau Street, New York.

THE UNITED GAS IMPROVEMENT COMPANY,
Philadelphia.

Telegrams: {"EPISTOLARY, LONDON."
{"HUMGLAS, NEW YORK."

THOMAS GLOVER & CO.'S

PATENT NEW IMPROVED PREPAYMENT METER



For Pennies, Shillings, or any Coin.

Simple in Mechanism.
Positive in Results.
Price Changer *in Situ.*

GUARANTEED FOR FIVE YEARS.

Telegraphic Address: "GOTHIC, LONDON." Telephone No. 725, Holborn.

THOMAS GLOVER & CO., LTD.,
DRY GAS-METER MANUFACTURERS,
214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN, LONDON, E.C.
Telegraphic Address: "GOTHIC, LONDON. Telephone No. 725 Holborn.

BRISTOL: 28, BATH STREET. *Telegraphic Address: "GOTHIC."* Telephone No. 1005.

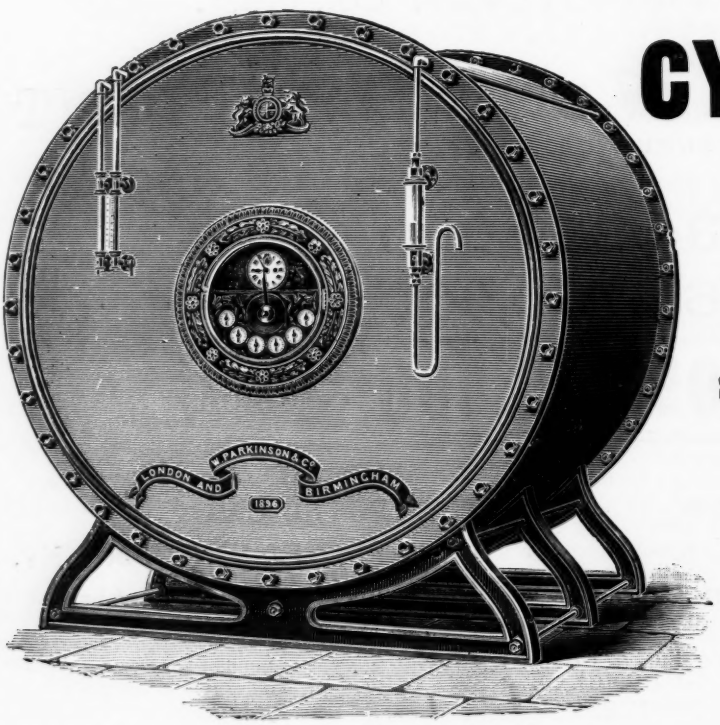
BIRMINGHAM: 57 & 58, BROAD STREET, *Telegraphic Address: "GOTHIC."*

MANCHESTER: 132 & 134, CORN EXCHANGE BUILDINGS. *Telegraphic Address: "GOTHIC."* Telephone No. 3898.

GLASGOW: 26, WEST NILE STREET. *Telegraphic Address: "GASMAIN."* Telephone No.: 6107 Royal.

PARKINSON'S

CYLINDRICAL METERS



Some have been in constant use for over **60** Years.

PARKINSON AND W. & B. COWAN, LTD.
(*Parkinson Branch*),
COTTAGE LANE, CITY ROAD, NDON.
BELL BARN ROAD, BIRMINGHAM.

JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. LXXXII., No. 2089.—TUESDAY, MAY 26, 1903.

EDITORIAL NOTES.

The Meeting of the Institution of Gas Engineers.

AFTER a long break, the gas profession will meet again in a corporate body, as the Institution of Gas Engineers, from June 9 to 12, at the Institution of Mechanical Engineers. For this event, the programme has now been completed; and although, from the bare outline of the arrangements now before us, a forecast of the quality of the proceedings cannot be made, it can be said that in certain respects they will possess pleasing features—foremost, of course, being the one that the occasion marks the return of that unity which will promote the reputation of the profession and the highest interests of the gas industry, of which every gas man, whatever his position, is an integrant part. This first annual meeting of the new Institution will be an epoch in the annals of the profession; and, this being so, the duty devolves upon every member to do his utmost to make it a success worthy of such a historic occasion. To realize such success, liberal succour will be imperative during the days of the meeting; for it may at once be confessed that, taken as a whole, the programme does not come up to the anticipated pitch. Its essential parts do not by any means reflect the strength of the amalgamation; and they lack, from the technical point of view, the looked-for lustre. It cannot be said that the Council have, in their endeavours to collect the material for this first annual meeting, been loyally supported by all ranks of the profession; and so the Council cannot—especially remembering the amount of work they have lately had in hand—be accounted responsible for a programme which, *primâ facie*, impresses one as being extraordinary in its commonplace character. If, therefore, the meeting is to have a worthy degree of success, then the support which has so far been withheld must, we repeat, be brought to bear upon the proceedings. The responsibility for the result rests upon the members.

As pointed out, four days will be claimed for seeing the events of the meeting through, though three morning sittings, it is thought, will suffice for disposing of the business and technical work. The first morning will be partly occupied in the consideration of general matters, among which will be the nomination of five gentlemen—all of whom are eminently connected with the industry—for the distinction of election to honorary membership. The choice of the Council will be popular; and the names are bound to be acclaimed from all sides. They are Mr. George Bray, Mr. Thomas Fletcher, Mr. Joseph Hepworth, Professor Vivian B. Lewes, and Sir George Livesey. Then will follow the Inaugural Address of the President (Mr. Andrew Dougall, jun.), who enjoys the respect of the entire profession, and will, in the discharge of the duties of his high office, command the cordial support and sympathy of all classes of membership. It is rumoured that his address will deal largely with the opportunities which the amalgamation yields for developing the life and interests of the profession and the industry generally; and further—the occasion being exceptional—it may be found that a departure will be made from the customary treatment of *ex cathedrâ* utterances, and that the President will submit this particular portion of his address to discussion. If true—as we hope it is—such a course may result in helpful suggestion and guidance for the Council.

An excellent change has been made, as the result of recent criticism, in entering the proceedings of the Benevolent Fund for consideration at the opening of the session on Wednesday; and thereafter Professor Vivian B. Lewes will lecture on "Calories and Candles." The reading and discussion of papers will be spread over the disposable balance of time on Tuesday and Wednesday mornings, the whole of Thursday morning, and, if necessary, there will be an afternoon sitting on the last-named day. It is in regard to the want of diversity in the matter of the technical contributions that the greatest disappointment is sure to be felt. Coal-gas constructional work, plant, and manufacture are altogether ignored; and the nearest approach that we have to these subjects has only a financial relation. At the same time, the question—"Unproductive Capital and its "Relation to Renewals"—is a highly important one; and it is down for introduction by Mr. Arthur Valon. We are glad to find that Mr. Sidney O. Stephenson has been prevailed upon to submit the remarkable results he has achieved with "The Lewes Process at Tipton" to the criticism of a meeting constituted, as this will be, of men of all shades of opinion and experience in water-gas and coal-gas manufacture. Of the total of seven papers, no less than three will be devoted to lighting, and mainly to the high-pressure line. One will be by Mr. F. D. Marshall, of Copenhagen; and he will describe "The 'Selas' System of Intensified Gas "Lighting for both High and Low Pressures." Mr. A. W. Onslow, of Woolwich, will tell the story of his "Later "Developments in High-Pressure Lighting." Mr. W. T. Sugg is booked for a paper on the same subject, but the title—"High-Pressure Gas Incandescent Lighting"—does not afford any indication of the particular direction in which he will deal with it. A paper by Mr. Walter Grafton on "Photometry and Testing" comes opportunely; and it is a subject that, with a good lead from the author, should produce a bright and instructive discussion. The residuals department has one representative in a contribution, by Mr. J. Ballantyne, of Hamilton, on "Sulphate of Ammonia "Making by a New Process." As topics for discussion, some of the papers promise well; but the others will have to be of a high order to provoke any large amount of enthusiasm. The social engagements for the week comprise a *conversazione*, on Tuesday evening, at the Royal Institute of Painters in Water Colours, by the invitation of the President and Mrs. Dougall, and an excursion to Eastbourne on Friday, when there will be a luncheon and tea in the Pavilion of Devonshire Park, and an afternoon drive to Beachy Head.

The Ownership of Gas Undertakings.

IN another part of the present issue of the "JOURNAL" will be found an abstract report of some proceedings of the United States National Convention on Municipal Ownership and Public Franchises held under the auspices of the Reform Club of New York in February last, to which brief reference was made last week. So far as it went, and was possible to go, the Convention seems to have been a success. At any rate, the immediate object of the promoters was attained, which was the bringing into the light of day of the chief elements of a very important and complex question of domestic politics. As it was put to those invited to take part in the Convention, what was to be debated was the *a priori* assumption, on the part of Municipalists, that all local public services of the character of gas and water supply, electric lighting, tramways, and telephones should be undertaken by the local authority; and the direct negative given to this proposition, by extreme Individualists, that the functions of such authorities should be restricted to matters of government, and all services partaking of a trade character left to private initiative. We, in the United Kingdom, are very familiar with this question of the day. As regards gas supply, it is notorious that the whole burden of the proof of the expediency of municipal trading lies upon the commonly accepted axiom that, in the United Kingdom, municipal gas supply at any rate is a pronounced success. Every sovereign of the "profit" realized from municipal gas is made a reason for attempts to make more—or an excuse for losing money in other enterprises.

It is dangerous to tread the "high *a priori* road" in matters of politics, regardless of the sordid question of expediency. An abstract principle in this regard is like a magnetic compass, which will give a traveller his bearings indeed, but leaves him to pick his way. Questions of expediency are the incidents of the road—details which the most intrepid wayfarer dare neglect only at his peril. In this matter of the principle of municipal trading—or national trading, if it comes to that—it is impossible to limit the political issue to

gas supply or to telephones. The actual problem is broader and deeper than any particular illustration which betrays its existence. A suspicion of this truth inspires the inquiry often heard in English debate, as to what are or are not fit and proper fields for the enterprise of public bodies. It is a difficult question to answer. Perhaps some help is obtainable from a study of the American use, in this connection, of the word "franchise." In current English speech, this word has become specialized to signify the right of voting for a member of Parliament. It has, however, a larger meaning which Americans have been able to preserve in common use. This is, as our dictionary gives it, that of "a privilege or right granted." It seems clear that the authority which grants a franchise may prefer to limit it in any way, or even, if feasible, to exercise the privilege itself. A franchise, in the sense attached to the word by American publicists, is an incorporeal form of property, similar to those that in Continental countries are made the subject of "concessions." In England, Private Acts of Parliament, Royal Charters, patents, privileges exercised by licences of all kinds, create the same form of property. In every case, and always, some consideration is required to be exchanged for the grant. The difficulty is, in regard to all important and valuable franchises, to secure fair, adequate, and proper consideration from the grantee.

It is the last-named trouble which Municipalists seek to obviate by the short way of taking the privilege into public hands. It will be perceived, from this remark, that we have jumped at the solution of the difficulty set out in the beginning of the preceding paragraph, and assumed that a local authority can properly do for itself anything which it, or Parliament acting in the same general interest, can license an undertaker to do. Let this solution serve for the time being, for the sake of brevity. The main objection to this proceeding on the part of authority is the question of expediency, which is Protean. It implicates the character of the public body itself, the nature of the service required, the consideration of compensation of vested interests injuriously affected, and, in fine, an endless array of consequential questions. There is no "Royal road" through, over, or past all these obstacles to the universal nationalization or municipalization of properties which might quite legally, and as a point of principle alone, be nationalized or municipalized. This is the reason why all *a priori* discussion of the subject is so essentially academic. Moreover, all the *a priori* arguments are not on one side. Against that for municipalization, can be urged the contention that the elimination of self-interest in the result is not by universal experience conducive to efficiency of operation.

Assuming that the force of individual interest, energy, and initiative is not to be removed from such public supply undertakings as require a certain amount of privilege for their most economical operation, the practical problem becomes that of uniting this element with something to effectually prevent it from overstepping the bounds of justice to the community upon whom the value of the franchise depends. By virtue of this source of value, which is inalienable from its origin, the community can, and does, impose obligations of many kinds upon its licensees. Not to go into this part of the study at large or at length, let us confine ourselves to the case of gas supply. All sorts of compensatory requirements have been imposed upon gas companies in different parts of the world, and at various periods in the history of the industry, with different objects, and not always well conceived. It is inevitable that mistakes should occur, when misunderstandings prevail as to the proper treatment of a gas franchise. Seeing that the economics of the gas industry are even now not equally well understood everywhere, it is not to be wondered at that the drafters of ancient concessions and Acts of Parliament often went astray from the road they wished to follow. Even when they were bent upon securing the only proper purpose of a gas franchise—the realization from time to time of the cheapest possible supply of the most serviceable gas, consistent with fair remuneration of the capital employed by undertakers using due care and diligence in the conduct of their business—they usually failed in their object. It would be something to be thankful for if one could truthfully say that any paper guarantees to this end were ever successful, in the absence of satisfactory human co-operation.

In the whole course of the recent Conference, the real point of all effective gas company regulation was brought out by Mr. Alton D. Adams, and by him alone, in the striking observation that it consists in the prevention of the watering of stock. The object is to secure reasonable prices for gas; the best way to obtain it, is to make sure that the capital is honestly represented in realizable assets. In no country in the world was the creation of bonus gas capital checked by enactment, until the auction clauses were adopted by Parliament. It can be done still in most places outside the United Kingdom by a mere resolution of the directorate. Naturally, being human, the proprietors are willing to take this advantage whenever they have the chance. The issue of excessive capital, paid for in cash, was an evil which the English Act of 1847 could not prevent. Not even the auction clauses will avail to obviate the effects of bad management or over-capitalization—really the same mischief. But there is no better check in operation anywhere to-day; and, obviously, it completely stops watering. A Government audit, and the full publication of accounts prepared in a standard form, are necessary accessories to this enactment. A sliding-scale of dividend and of price is good in its way. A legal remedy against either wrong-doing or culpable mismanagement is likewise essential; for even self-interest does not invariably teach wisdom, and partners are occasionally driven to go to law with one another, in this world tainted with perversity and unreasonableness.

The Beginning of Reform in Manchester Gas Polity.

THE self-denying ordinances by which the Manchester City Council decided on Wednesday last to abolish the charge hitherto made for the hire of gas-cookers, and to reduce the price of gas to private consumers by 3d. per 1000 cubic feet, are to be welcomed as showing that the cause of truth and fair-dealing has not lost its ancient attribute of prevailing in the long run. Two years ago a proposal to reduce the price of gas by the same figure was rejected by the Council. Since that time, a sense of the unfairness that was being done to the consumers of the City gas must have been working into the minds of the members of the Corporation and their supporters. The Manchester people have accordingly had their eyes opened to the truth that so-called gas profits are only local taxation—placed, moreover, upon the shoulders of a minority of the population. So long as the profits of the gas undertaking appeared to be earned in the ordinary way of trade, their real nature was not perceived by an essentially industrial and commercial community, accustomed to the rule that trades should yield profits if they are to be worth carrying on at all. When, however, it was advertised in the boldest manner, two years ago, that Corporation gas "profits" merely meant whatever the Council by resolution decided to make the gas consumers pay, a revulsion of feeling in this regard followed. Mr. Alderman Gibson is to be congratulated on the triumph which will be all the more gratifying for a delay which has allowed opposition to die a natural death. Mr. Alderman Mainwaring, also, is to be complimented on the clear way in which he showed how disproportionately the consumers of City gas had in the past contributed to the support of the spending Committees of the Corporation. Lastly, Mr. Alderman Gibson and the members of the Gas Committee must be credited with a masterly stroke of statesmanship in sweetening their new departure by handing over as a special gift an extra sum of no less than £20,000 for the year, in order to avoid the disagreeable alternative of the rates being raised 1½d. in the pound. In doing this, it was made quite clear that the Gas Committee were the only friends of the ratepayer. The Tramways Committee, with all their show of business, could not spare half as much; while the Electricity Committee do not appear to have been thought of at all as possible contributors to the City's purse. The Gas Committee had the money, and they handed it over as a sort of "dash" on the deal. It will serve to confirm the people in the newly-found opinion that henceforward the gas consumers should have their turn. They have been bled almost "to the white," as the French say. Now it is high time that the finances of the gas undertaking itself should receive attention. The capital is too large, and partly represented by old and obsolete works, the cost of which should be written off as early as possible. Besides, the spending departments of the Corporation should be taught to depend fairly and squarely on the ratepayers as a whole, not on a minority without a voice in the disposition of their contributions. It is a brighter prospect for Manchester.

The Hard Case of the Crewe Gas-Mains.

THE rejection by the House of Lords Committee of the gas-main laying clause of the London and North-Western Railway Bill will command general approval. The Railway Company furnish gas to the town of Crewe from their works, which are primarily run to supply the Company's own factory. This supply has always been by agreement; the Company charging a reasonable price, and contriving to please their customers without any of the usual "safe-"guards" provided by an Act of Parliament. In short, there were no statutory privileges or requirements in the case. In course of time, the gas property of the Railway Company in the streets of Crewe has grown to very respectable proportions; and the Company's Bill for this session was made to bear a clause conferring upon them the facilities provided by the Gas-Works Clauses Act, 1847, for the laying of mains. Hitherto, of course, this has been done by consent of the Local Authority, as is usual in the case of non-statutory suppliers of gas. The idea that the Railway Company could pick out of the general law of gas supply just the facility they wanted, and not come under the rest of the terms of the law, proved to be more than the Committee would stand.

There was, of course, some reason for the desire of the Company to obtain main-laying powers without incurring any of the obligations towards the public which ordinary gas companies have to accept as the *quid pro quo* in this matter. The London and North-Western Railway Company are not a gas company, and most of the usual stipulations applying to the supply of gas by statutory undertakers are inapplicable to them. Moreover, it doubtless appears rather hard measure that this Company, who originally "obliged" the people of Crewe with gas, to no great profit, should now see all their pipes in the streets of the town legally at the mercy of a Local Authority who do their own electric lighting. Still, although one may sympathize to a certain extent with the Company, it is impossible to justify their peculiar notions of the use to which they might put the 1847 Act. Gas law, like other laws, must be taken as a whole, if at all. Confusion would be worse confounded, indeed, if everybody was at liberty to pick out this or that piece of law for his own observance. Non-statutory gas supply is an interesting business, such as there is of it; and there can be no cross between such concerns and those which lead a statutory existence.

The Writing of Decimals—Caution to Authors of Technical Papers.

THERE is an aspect of the perennial question of the comparative merits of the decimal system of writing fractional quantities, as contrasted with the expression of the same order of quantities as vulgar fractions, to which insufficient attention is given by those who are wont to discuss the subject at meetings of scientific and technical societies. In the statistics of the gas industry, with the publication of which the "JOURNAL" has so much to do, decimal fractions are largely employed for the sake of their convenience for certain purposes. It is, of course, a commonplace of this controversy that for nearly all calculations on paper it is more convenient to work by decimals than by vulgar fractions, which are terrible things to add, subtract, multiply, or divide. Naturally enough, most of the results of calculations in decimals are left in this form, as numbers having a decimal point somewhere about them. This is just where trouble occurs; for the mistakes in writing and printing decimals are multitudinous, and often vexatious to the last degree. Some of the professed advocates not merely of decimals, but also of the metric system of weights and measures for all purposes, should have a spell of printing-office experience of the use of these numerical expressions involving the placing of the decimal point. Nor is this all; for after the printers have done their best (or worst) on decimal numbers, it is often a matter of impossibility for anyone, who wishes to profit by the result of their labours, to make quite sure that the numbers he reads are correct. This is because decimal quantities do not directly appeal to the perception of the average mind. Time and again there come to this office reports and statistics which it is a work of considerable labour and difficulty to make into sense, even when one knows what they are meant to convey, because printers unaccustomed to the task have displaced decimal points and commas, and sprinkled full stops everywhere except where they were wanted. Nor are engineers to be implicitly trusted with decimal points. The careful reading of proofs in which figures are given, is not at all a common accomplishment. One person after another who should notice a mistake of this kind will fail to do so, because the number does not look absurd, like a misprinted vulgar fraction; and it is perhaps only long afterwards that, upon the printed figures being referred to, they are discovered to be unintelligible.

The subject is mentioned here as a warning to readers of technical papers, who wish to be understood, not to speak in decimals when vulgar fractions, or aliquot parts of common units of weight or measure, will do as well. There is a cheap kind of pedantry which prefers to say a "circular "orifice" instead of a "round hole;" and the same sort of foolishness leads to such expressions as "point five of a "penny" when a halfpenny is meant. It should be remembered that every stop marked in a piece for printing increases the risk of error indefinitely. For this reason Private Acts of Parliament affecting important interests are printed without punctuation, lest undesigned injury should be inflicted upon anybody as the result of misplacing or omitting a comma. It is impossible to prevent such mistakes. The last "revise" passed for press may be quite correct; but the subsequent accidental dropping out or obliteration of a tiny stop may alter the sense of what is printed. How rash, therefore, are the statisticians who trust everything to a decimal point! It is to be hoped that, when next this subject is aired in discussion, this aspect of it may not be overlooked. At the same time, attention might be given to the other aspect of the question which was treated of when last the subject of decimals was mentioned in these columns—the several ways in which the decimal point is written by authors of different nationalities. For a style of notation which is recommended as much on the score of uniformity as for any other reason, the existence of these discrepancies is disconcerting.

A Good Year at Birmingham.

The past year's working of the Birmingham Gas Department has been a successful one; for while the total expenditure was £7700 less than in the preceding twelve months, the income was £26,356 more, and the net surplus (£56,920) was £26,263 more. The price of coal, which had necessitated the raising of the charge for gas by 3d. per 1000 cubic feet, has now fallen; and it is predicted that a reduction in the price of gas will be made as soon as the coal contracts for next year are completed. This prophecy, though it will bring joy to the hearts of the consumers, affords "matter for criticism" to one of the local papers, inasmuch as the price of gas was not raised in proportion to the extra cost of coal. "Had it been," says the writer, "the sum paid to the rates would have been greatly swollen—which means that the ratepayers considered as such, and not as gas consumers, have been robbed of some of their profit." Seeing that the amount to be handed over in relief of the rates is £56,920 (to which has to be added the £4000 interest on the reserve fund of £100,000 made up by the department some years ago, and £15,000 saved to the city in the reduced price of gas for public lighting), it is somewhat difficult to perceive where the hardship to the poor ratepayers comes in. We should rather have felt inclined to congratulate them on the excellent result that has been attained, and to say that the department can well afford now to grant some concession to the consumers. Our contemporary, however, does not see the matter in this light, and argues that, though everyone does not use gas, those who do not have as much right to be considered as those who do; and the reason adduced for this assertion is that "were the Gas Department losing money, the non-consumers would be called upon to meet the loss by means of heavier rates." This strikes us as being somewhat illogical—coming, as it does, just after the statement that when the price of coal was raised the charge for gas was also increased, which seems to prove that it is the consumers, and not the ratepayers, who have to bear the "risks" of the undertaking. It must, however, be admitted that the price of gas in Birmingham is very reasonable; and if the principle of earning a profit on the works is generally approved of in the

city, it might save a lot of dissatisfaction in the future, if, as was suggested by one member at the Council meeting last week, a certain fixed amount were determined upon to be paid annually to the rates as interest on the working of the undertaking.

The Sleeping Partner.

A discussion which took place at a recent meeting of the Walmer Urban District Council (and which is briefly reported in another column) illustrates in a striking manner the correctness of the contention we have so often put forward with regard to the relief of the rates by means of profits made out of the trading departments of municipalities. It is true that in the case in point it is the supply of water which has given rise to the quandary in which the Council find themselves; and, of course, water-works are not quite on the same plane with other "reproductive works." But however this may be, the Walmer District Council have made a profit amounting, on the past five years' operations, to something over £2000; and the Water Committee recommended that £1000 of this should be paid over to the credit of the general district fund, which would mean a bonus to the ratepayers of about 1s. in the pound. Now it so happens that more than one-sixth of the total quantity of water supplied is taken by the Admiralty for their barracks; and the price paid by them was fixed by arbitration at a figure so much less than that charged to the ordinary consumer, that it is said to yield no profit whatever to the Council. The Admiralty are, of course, very large ratepayers; and from any allocation of water profits to the relief of the general district rate, they would derive substantial benefit—thus reaping where they did not sow. This is what is troubling the Council; and it is amusing to notice the disgust of the members (as water consumers) now that they realize the fact that they will be paying a portion of the Admiralty's ordinary rates. Can they not exclude the Government Department from participation in the bonus, they plaintively inquire. Certainly they can—on future occasions, but not on the present one—by reducing the charges for water all round to such an extent that there will be no surplus which, in accordance with the Act, must be handed over to the general district fund. If, however, a sum is to be handed over, they can hardly discriminate between one ratepayer and another. Could it ever be possible to fully justify the relief of rates by means of municipal trading of this kind, the Admiralty in the present instance would be entitled to benefit with others, though they may have had no share in making the profit which has been realized. The theory is that the business is carried on at the risk of the ratepayers generally; and, viewed in this light, the Admiralty merely occupy the position of "sleeping partners." In return for the "risk" they run, they have a claim to a share of the profits. The fact is, of course, that the ordinary customers of municipal undertakings bear the risk; for in face of a deficit they promptly have to pay increased charges, and why should not the losses and the profits fall upon the same persons? We hardly looked to Walmer to demonstrate in so convincing a manner the weak points of a principle that is dear to our municipal trading friends. The Admiralty at Walmer and the non-gas consumers in towns where the works are owned by the municipality have just about the same claims to consideration.

Obstructing the Welsbach Capital Reorganization.

The first attempt of the Directors of the Welsbach Company to pass their capital reorganization scheme has proved abortive, through the obstructive tactics adopted by an insignificant preference holding minority, who are clamouring for their full pound of flesh, in opposition to the desire (expressed in a manner which does not admit of any uncertainty) of the vast majority of the holders of all classes of stock and shares in the Company. The statutory requirement that there should be, at the meetings held to consider the question of reorganization, a representation, either in person or by proxy, of two-thirds of the holdings of the separate classes, put the power into the hands of the objectors to bring about the collapse of the special meetings last Wednesday; but so close did the total representation come, and mostly in favour of the Directors, that the Chairman (Mr. Edgar Williamson) and his colleagues are sanguine as to their ability to get the full representation at the adjourned meetings to be held to-morrow. One of the meetings on Wednesday—the preference—could have been held if the opponents who had canvassed the holders of stock (with an inglorious result compared with the proxies given in favour of the scheme) had only lodged the proxies they obtained. The opposition were strong in their weakness; for only a few thousand pounds were required from what is believed to have been their miserable backing to make up the million pounds representation needed to proceed with the holding of the preference meeting. That it is possible to frustrate an important meeting of this kind by such feeble means and methods is a great pity. The whole excuse for the opposition of this minority is the question of the distribution among the preference holders of the accumulated funds, over which, against the highest advice the Directors can obtain, the malcontents are anxious for the Company to go to law again in order to test the matter. In their short-sightedness, the opposition fail to see that it might be at least a couple of years before a final decision could be obtained from the Lords. Valuable time would be wasted, and the present promising interests of the Company deplorably jeopardized. For these accumulated funds the majority of the preference holders, it is apparent, have no care; their sympathy being with the Directors and their own future interest in getting the business as quickly as possible on a stable and dividend-earning base. If the deferred shareholders, too, do not exert themselves a little more than they did previous to last Wednesday, they will bring about their own total destruction. The Board earnestly invoke the hearty co-operation of all classes of stock and share holders, as it will not be possible to carry through any reorganization without their active assistance. Should the present effort to place the capital on a proper basis fail by reason of the inability of the Board to get the necessary quorum and majority to-morrow, there is no doubt about this, that the resumption of dividends will be indefinitely postponed, and the interests of all classes of the proprietors will be seriously prejudiced. More as to what took place at the meetings last Wednesday is indicated in the sketch of the proceedings in another column. Since writing the foregoing, it has been stated by the "Pall Mall Gazette" that, as the result of careful inquiries, the Directors now find themselves in possession of sufficient proxies for the required quorum of both preference and ordinary shareholders, as well as for the defeat of the opposition. If this is true, it is good news.

Prepayment Meter Law.

The Blyth and Cowpen Gas Company found themselves confronted by a quite unexpected difficulty a short time since, when charging a woman at the local Police Court with having stolen a sum of money from a prepayment meter fixed in her husband's house under an agreement with the Company. It appeared that on one occasion the defendant went to a neighbour and applied for a loan; and the latter suggested that she had better get the money from the gas-meter. This she did, by forcing the lock; and the inspector on his visit found the money-box practically empty. The defendant then asked if she would be allowed to refund the amount. After a recital of these facts, the Magistrates' Clerk gave it as his opinion that the case was one of wilful damage only—the woman obtained the gas, and said she would pay for it afterwards. There was nothing to show that the money had ever been in the possession of the Company. To this, the prosecution replied that the money-box was the property of the Company, as was shown by the fact that they retained the key; and therefore the money in it was theirs. The Clerk, however, replied that the agreement showed the husband to be liable for the gas consumed; and that therefore the money abstracted was his. The woman took a temporary loan; and when the Company asked for it, she was willing to return it. The prosecuting Solicitor urged that there were week by week convictions in similar cases to this; and so the hearing was adjourned to enable him to produce newspaper cuttings bearing out his contention. He did not, however, succeed in finding a case in which the wife of a consumer had been charged with committing a larceny by abstracting money from a meter; and the Clerk pointed out that it was the fact of her not being a stranger which created the difficulty. When asked to plead, the defendant replied that she had "registered some of the money"—meaning by this that she had put a penny in and used it several times. The Clerk, however, advised her to plead "Not guilty;" and after some consultation, the Bench decided to adjourn the case, in order that the Clerk might look the point up and obtain opinions about it. The charge against the neighbour referred to, for aiding

and abetting in the stealing of the money, was also adjourned, pending the result of the inquiries. It is, of course, impossible to pass an opinion on the matter at the present stage; but we shall await with some curiosity the decision of the Blyth Magistrates on one of the many problems which have arisen with regard to the supply of gas by means of prepayment meters.

American Methods of Enhancing the Usefulness of District Gas Managers' Associations.

We have been giving some prominence, the past week or two, to the Progress Department of the Ohio Gaslight Association, as edited by Mr. Irvin Butterworth; and this week we publish an abbreviated account of the Question-Box Department. We say "abbreviated" advisedly, seeing that the original report, as printed for circulation among the members in advance (which was noticed in the "JOURNAL" for the 14th ult.), is a document of some 150 pages, comprising 160 questions, with a number of answers contributed by 73 members. Mr. Henry L. Doherty is the Editor of the Question-Box; and in submitting his report, he expressed some disappointment at the incompleteness of the answers, and in an apologetic tone promised better things next year. From this, it would appear that his ideas of a fully complete report are something approaching the whole of the other transactions in extent. Secretaries and Presidents of District Societies will cast envious eyes on the Ohio Association, in respect to such enthusiastic members as Messrs. Butterworth and Doherty; while the dilittante member who considers he fully discharges his duty by showing up at a meeting occasionally, and by remitting the annual dues (none too punctually), will be simply appalled at the extent of the labour undertaken by the Editors of the "Progress Department" and the "Question-Box" respectively. We do not care to pass such labours without a word of appreciation, not merely of the intrinsic value of the work, but also of the extent of time and trouble so ungrudgingly devoted to an endeavour to raise the platform of the Ohio Gaslight Association. If every similar society possessed equally active workers on the list of members, the Association would indeed become a power in the land.

WATER AFFAIRS.

Officering the Metropolitan Water Board.

THE special meeting which the Metropolitan Water Board held last Friday will stand out prominently in the early records of this important body. The announcement that the Arbitrators under the Metropolis Water Act, 1902, would commence their sittings on the 29th inst., and the close proximity of that date, rendered urgent the duty of selecting someone to guide the Board, and more especially the Law and Parliamentary Committee, in their proceedings before the tribunal. The Water Companies' statements of claim were duly deposited by the 16th inst.; and though the Board have till the 17th of August—a period of three months from the lodgment of the claims—to prepare their answer to the first of them, which is that of the New River Company, it was obviously inadvisable to go on very long without expert assistance. The first business on Friday, therefore, was the appointment of a Clerk. The decision of the Board to pay this official £1500 a year was quite sufficient to arouse the ambition of a goodly number of applicants for the position; and therefore we are not surprised to learn that 121 endeavoured to obtain it. But the Clerk of such a body as the Metropolitan Water Board requires to possess, it seems to us, special qualifications which differentiate him from a Town Clerk or from the Secretary of a large Water Company, however able; and so the General Purposes Committee probably had not much difficulty in selecting ten of the applicants for personal interview. The names of three of these were submitted to the Board; but, in the result, the contest lay between Mr. A. B. Pilling, the Town Clerk of Devonport, and Mr. William Terrey, the General Manager of the Sheffield Corporation Water-Works; and the choice fell upon the latter gentleman by a fairly large majority. Having been in a position to follow Mr. Terrey's career at Sheffield, we have not the least hesitation in expressing the opinion that the Board have secured a thoroughly capable and conscientious official, and one, moreover, who is exceptionally qualified, by the special experience he has gained, to fill satisfactorily the position to which he has been elected. We congratulate him heartily upon his success.

The other important business transacted last Friday was the appointment of Messrs. Linklater as the Solicitors of the Board, and of Mr. H. L. Cripps as the Law and Parliamentary Adviser. As the senior member of the firm of Messrs. Dyson and Co., the well-known Parliamentary Agents, in which capacity he conducted the case of the London County Council in all their contests over the Metropolitan Water Question, not to mention the fact that he is the author of a book on the subject, Mr. Cripps will bring to the service of the Board the accumulated knowledge which long familiarity with the various phases of the question has enabled him to acquire. He will be an expensive adviser, as his retaining fees will total up to nearly £5000, with an additional 500 guineas if the arbitration proceedings last more than eighteen months. But as he is probably the only man who is in a position to give the Board exactly the assistance they need in this connection, and will be responsible for conducting investigations involving many millions of money, his special abilities had to be secured regardless of cost. In point of fact, if the proceedings are so protracted that he can claim his extra fee, his remuneration will be equal to that paid to each of the Arbitrators—viz., £5250. It will thus be seen that the Board will enter upon the arbitrations with an outlay of £21,000 in fees staring them in the face. This is not bad for a beginning.

A Prosperous Water Company.

AN attack of illness, which unhappily was so serious as to call for the issue of bulletins for a few days, deprived the proprietors of the West Middlesex Water Company of the presence of Mr. Edmund Boulnois, M.P., their Chairman, at the half-yearly meeting on Tuesday last. Mr. Jackson Hunt, however, who occupied his place, was able, in moving the adoption of the report, to congratulate the shareholders once more, though he regretted to think for nearly the last time, on the continued prosperity of the undertaking. The increase of £3100 which he announced as having taken place in the revenue in the half year ending at Lady Day is not surprising, when one considers the growth of the Company's district to the north-west—in the neighbourhood of Willesden—during the past eight or nine years. In that time the speculative builder has waged unceasing war against Nature, with the result that rurality has gradually disappeared before the advance of bricks and mortar. But what has been a destructive element in one case has been a constructive one in another. The rows of houses which now cover what a few years ago were beautiful fields have brought a demand for water which has necessarily increased the Company's income. The Directors have met the demand by giving a constant supply; and they have secured at Dollis Hill, in the immediate vicinity, a site for a service reservoir which will prove most valuable to their successors. When the time comes for the undertaking to be handed over to the Water Board, it will carry with it a record of half-a-century's payment of 10 per cent. dividend on the capital invested; and the Directors see no reason why this income should not be guaranteed to the proprietors in perpetuity. At all events, the Company's claim has been sent in, and it stands fourth on the list; and the Directors have sufficient confidence in the tribunal before whom it will come to rest assured that it will have the fullest and fairest consideration.

International Committee on Photometry.—The "Journal für Gasbeleuchtung," in announcing the meeting of this Committee at Zürich, from the 19th to the 22nd prox. (that is to say, immediately before the annual meeting of the German Association of Gas and Water Engineers in that city), states that communications on the following subjects have (*inter alia*) been promised: (1) "A Comparison of the Value of the Standards of Illuminating Power of Hefner, Carcel, and Harcourt (10-candle-Pentane Lamp)," by Professor H. Bunte, of Carlsruhe, and the Imperial Physical-Technical Institute at Charlottenburg; (2) "Researches on the Resistance of Mantles to Mechanical Agitation, carried out by aid of a specially constructed apparatus," by M. Théodore Vautier, of Lyons; and (3) "The Standardization of Screw-Threads for Gas-Fittings," by M. J. A. Payet, Organizing Secretary of the Société Technique de l'Industrie du Gaz en France.

ESSAYS AND REVIEWS.

THE DECISIONS OF SIR JOHN BRUNNER'S COMMITTEE.

It is to be expected that the remarkable dealings of Sir John Brunner's Committee with the Crystal Palace District Gas Company's Bill will be misunderstood and misrepresented by non-technical writers on the subject. It will be something to be thankful for if those who, by their official position in connection with gas undertakings, should know better, do not fall into some plausible error in interpreting the Committee's decisions. It will therefore not be trouble thrown away to distinguish as plainly as possible precisely what these all-important pronouncements mean for the Gas Company concerned and for the gas industry generally.

As regards the repeal they allowed of the statutory requirement to practise purification of the gas manufactured by the Company from the so-called sulphur compounds—the abolition of the sulphur impurity limit, in effect—it must be remembered that the one consideration that prevailed with the Committee was the fact of 90 per cent. of all the gas undertakings in a list laid before them being free from every restriction of the kind. There was evidence that sulphur purification—to be more exact, the purification of gas by lime—is not practised on the Continent of Europe. Purification by iron oxide, or some preparation of iron in the form of those purifying "masses" to which Continental gas managers are partial—doubtless partly by reason of the lack of suitable native oxide—was shown to be esteemed good enough by the enormous majority of gas engineers and the communities served by them. That settled it. At the same time, it would be dangerous to assume that the Committee were indifferent to the presence of sulphur impurity in coal gas in forms other than sulphuretted hydrogen. What they were willing to condemn was rather the costly, cumbrous, offensive, and only partially successful employment of lime for the purpose of removing a comparatively insignificant proportion of this form of impurity. It will be as well to bear this truth in mind. In theory, of course, the presence of any sulphur impurity at all in an illuminant which is burnt in interiors without any special ventilation for the removal of the products of combustion, is objectionable. It is, practically, a question of degree. The amount of the resultant sulphurous acid in the atmosphere of an apartment, which could be detected by the senses, or by its effects upon metals, tissues, or fabrics susceptible to tarnishing or perishing by this agent, might be disputed to any length. Fortunately, such disputations are now generally recognized as idle. A foggy day in any town in which coal is burnt for industrial and domestic purposes—not to mention the effects of chemical industries—will tarnish metals never ordinarily exposed to the products of the combustion of gas. Leather bindings perish in town libraries howsoever lighted, or not artificially lighted at all. If the electric light had not taught the public anything else, it would have convinced townspeople that the ancient attribution of atmospheric dirt and sulphurous fumes exclusively to gas was erroneous.

In face of the facts, therefore, it is felt that to insist upon the reduction, in some few localities only, of a fraction of the native sulphur of coal gas, much of which is now used for other purposes and in other ways, from the fashion prevailing when sulphur compounds purification was invented, would be absurd. Sir John Brunner's Committee abolished it, not only for the sake of the economy of getting rid of lime purification and the unavoidable nuisance, but also with the object of setting free the gas manufacturer from cramping bondage. At the same time, the Committee gave numerous significant indications that to their minds all gas which is sold for domestic use, and for unrestricted burning in interiors generally, should be adequately and properly purified from sulphur. It would be the worst policy for those who have the responsibility of guiding the gas industry in these days, to offend against the spirit of this deliverance. If gas manufacturers are relieved from the obsolete requirement to practise lime purification for sulphur compounds, they must be all the more careful to keep the sulphur down by using every possible care and circumspection to this end. It would be suicidal for any gas manager to misuse this liberty to the public detriment. The solicitude of the Committee on this head was shown in the care with which they had it made clear that any easiness with respect to the selection of coals which their consent to the Company's proposals might bring in its train, should not be abused by the employment of a dirty raw material. It is not by any means unnecessary to lay stress upon this part of the question of purity. While the great majority of gas managers would never dream of buying objectionable coal or sending out foul gas, there may be a few who might regard this kind of thing as a smart way of getting credit for making cheap gas. One result of the new departure in regard to purification requirements should be to revive interest in the origin of carbon disulphide impurity. This is a study that should never be neglected in connection with the criticism of carbonizing methods and results.

Another point of supreme importance is the preservation of a reasonable standard of purity from sulphuretted hydrogen of gas intended for general consumption. Apart from such pedantry in this regard as finds favour with the Metropolitan Gas Referees (who interpret their duty to test London gas for sulphuretted hydrogen with a degree of particularity comparable with what would be required of a searcher for neon or helium in the atmosphere), manufacturers of lighting gas will find it agreeable to their interest, as well as being part of their duty, to attach importance to the elimination of sulphuretted hydrogen. For this is one of the differences between a proper lighting gas and all so-called fuel or power gases. There are other differences, of course, which those whose business is the manufacture and sale of lighting gas will be well advised to make the most of whenever this is expedient. We do not propose to go into these questions now. One thing at a time is a good rule; and the subject for the present is the purity of illuminating gas from sulphuretted hydrogen, which is one of its peculiar qualities. How important this is will be appreciated from the circumstance that the "Builder," which usually treats gas questions intelligently, makes a great deal of Professor Lewes's statement, given in evidence on the Crystal Palace District Gas Bill, that he had seen an incandescent light of 100-candle power developed by producer gas having a calorific power of 150 units per cubic foot. This statement, by the way, supplies a striking comment on the pretensions of the promoters of the South Staffordshire Mond Gas Bill, which were to the effect that this gas could not be used for lighting purposes—a piece of modest depreciation of the capabilities of the product which was not accepted as convincing by the opponents of this measure. Upon Professor Lewes's observation, the "Builder" comments as follows: "The numberless factories and foundries which make their own producer gas will now be able to supply their own lighting installations at a much lower cost than when supplied with coal gas." This is only what might have been expected.

The rejoinder is, that if these factories and foundries have no objection to burning sulphuretted hydrogen in their working atmosphere, doubtless the method of illumination indicated is open to them, whether the producer gas in question is home-made or purchased from a power-gas distributing company. We fancy, however, that H.M. Factory Inspectors would have a word to say upon the subject of the sulphuretted-hydrogen lighting of any interiors under their supervision; and even iron-works would find the arrangement open to objection. Of course, producer gas can be purified; but this would rob it of the sweet simplicity which is its chief charm. It is not every producer-gas user who would care to have a regular gas-works upon his premises. If it comes to be a question of a burning gas free from sulphuretted hydrogen, there is only illuminating gas which answers to this description. If the manufacturers of this gas are wise, they will see that the description is always justified. It has not invariably been so, in the case of some leading corporation gas-works that could be named. The only remark to be added to this argument for proper sulphuretted hydrogen purification is that some agreement should be arrived at in regard to a satisfactory test. The English practice favours a continuous test; while on the Continent an occasional test seems to be regarded as sufficient.

With respect to other actions of Sir John Brunner's Committee, and especially the *ipse dixit* of the Chairman in favour of 8-candle gas, the "Builder" agrees that there would be no objection to such a change, provided that a fully commensurate reduction in price were made, and a satisfactory calorific standard adopted. At present, we are told, all gas companies have power to reduce the calorific value of their gas "with impunity," owing to the absence of all restrictive legislation on the subject. This is true; but it is not said how long the gas companies might expect to keep their trade, if they were to send out gas which the consumer did not like. The tacit assumption that gas companies will defraud the purchaser of their commodity if there is no official tester to look after them, is strong presumptive evidence that these gas notes in our building contemporary are written by a gentleman of this order. It never seems to dawn upon the official mind that gas companies, like other traders, must please their customers if they are to live, although the fact is not laid down by any Act of Parliament. There is in England far too much of this kind of officialism, which seeks chapter and verse for everything. Recently, the Lord Chancellor electrified the House of Lords by declaring that if he had a servant who robbed him, he would discharge the fellow without waiting for him to be found guilty by a Court of Law. Similarly, the user of a gas-engine does not run to the County Council when the supply of gas is unsatisfactory. He has no scruples about sending round a complaint to the gas office if the engine "pulls up" by reason of any defect of the supply; and unless his grievance is attended to, he will not continue to use the engine. A gas-engine is a very sensitive calorimeter, as many gas managers have reason to know. We should not like to stand in the shoes of a manager who could not keep gas-engine customers—newspaper proprietors very often—on account of the badness or irregularity of the supply. He would be likely to hear of it, though the official tester might never have cognizance of what had happened.

The reference to the "commensurate reduction in price," of course, refers to selling price. Unfortunately, all the legislation on this subject has perforce had reference to the initial price under the sliding-scale, not at all to the selling price—to the "shadow," as Sir George Livesey has called it, instead of to the

"substance." As to the latter, there is no question but that his full share of all working economies must go to the consumer. Interfering with the initial price is only in reality due to the desire of the gas companies to give the consumers more than the sliding-scale share, by cutting off their own small portion of it. This has admittedly been overdone. If the Legislature and the public would only trust the gas companies so far as to abandon penalty testing altogether, as a "method of barbarism," and let the companies drive their trade on the natural commercial footing of pleasing their customers, whatever the official returns of the illuminating power, it would be the right thing in the right place. The talk in the course of the Crystal Palace District case about 8-candle gas is a little beyond the mark. As a matter of fact, the cheapest and most natural native coal supply to North German towns makes about 11-candle gas, English measure, without any sort of enrichment. It used to be made up to 13-candle power by the addition of English coal, or by benzol. When the practical German gas manufacturer saw that the great majority of the lights he had to supply had become of the incandescent kind, he quietly dropped his enrichment, knowing that the incandescent burners had no use for it. It is true that 8-candle gas has been sent into a German town without anybody finding it out; but this was by accident. German coal does better than that; and German gas managers do not make gas by the undue aid of the exhauster. One would like to know of an English coal, suitable for gas making, which would in the same way give a gas of as low an illuminating power as 10 candles, and also its price. Were such coal to be had in unlimited quantities, so that a run upon it would not put up the price, it would still be expedient to proceed in this direction by easy stages. So long as any considerable proportion of flat-flame burners continue to be used by the public—and their use is not always due to ignorance, as witness the butchers—there must be a fair degree of illuminating value preserved for the gas. A flat-flame burner with very low-grade gas does not betray poverty in its own appearance; but it barely makes darkness visible. Photometry or no photometry, a flat-flame gas-burner ought to show a step in a draughty passage; and we should have considerable sympathy with a public which was practically deprived of the use of the simplest, cheapest, and most reliable kind of burner. Gas of 13-candle power is the new minimum; but it should not be forgotten that 12-candle gas was originally the London standard. It is not certain that this standard is not still operative in a part of the Metropolitan area. A glance through the Board of Trade returns will show several undertakings that once thought 12-candle gas good enough for their customers; and they may return to the figure at any time. Sunderland is one example. Manchester, as is notorious, has no standard illuminating power; and in very many other places, from the absence of testing, the gas may be anything that suits the public. How do these benighted sufferers contrive to exist without a beneficent official to see that the gas company do not defraud them "with impunity," as the "Builder" has it? Probably the answer is, that no trader ever yet continued to defraud his customers systematically, and kept solvent. This, of course, is heresy in the eyes of the bureaucracy which understands that Acts of Parliament are passed mainly for the support of officials charged with the duty of seeing that their provisions are observed. It is nevertheless a heresy that bids fair to spread and blossom into a reformation.

FOR AND AGAINST MUNICIPAL GAS SUPPLY.

As briefly mentioned in the last number of the "JOURNAL," the whole of the latest issue of "Municipal Affairs," the quarterly publication of the Committee on City Affairs of the Reform Club of New York, is devoted to the papers read at the National Convention on Municipal Ownership and Public Franchises held under the auspices of the Club in February last. The convention was the outcome of a desire on the part of the members that the question of the municipal ownership of public undertakings, which prior to the year 1890 had not been very seriously considered, should be dealt with upon its merits, and that the assumption of the municipalists that public operation is *a priori* a desirable "platform," or that of the extreme individualists that all public activity is to be deprecated, should not be tacitly accepted. The convention was the first of national scope upon the subject, and it was so largely attended, and brought forth such wide comment and discussion in periodical literature, that it is fully expected to be followed by others. The extent of its operations may be judged from the following epitome of the subjects brought before the delegates, one of whom was Mr. Charles R. Bellamy, whose name our readers will doubtless remember in connection with his work as the former Superintendent of Public Lighting in Liverpool, where he now manages the street tramways. The President of the convention was Mr. John G. Agar, and he opened the proceedings with a short discourse on the problem of municipal ownership. He was followed by Mr. J. De Witt Warner, who spoke on the need of municipal operation to correlate local franchises. Municipal operation in the United States, Europe, Great Britain, and Germany, and municipal control of electric and gas lighting, telephones, street railways, and water supply, were the next subjects taken up. Examples of municipal lighting in Chicago, Detroit, and Wallingford (Conn.) were cited; and the various phases of the question were considered under many headings. For the present we will confine ourselves to municipal gas lighting, which was advocated by Mr. Alton D. Adams, who found an opponent in Mr. Walter S. Allen.

Mr. Adams acknowledges that individual enterprise has developed gas systems in the United States mainly in the hands of private companies, who are now, he says, doing more to bring about municipal ownership of gas plants than all other factors combined. Reasons for this are found in the evasion by some of them of their obligations to the public. One of these is that the rates charged shall be reasonable; and another that the issue of securities "that operate as a swindle on the investing public" should be avoided. These very elementary principles Mr. Adams asserts have been overlooked or ignored. Legislators have been slow to fix reasonable rates for gas, or to put effective limits on issues of gas securities, though Massachusetts has made a systematic attempt to do so. Reasonable prices, he says, imply reasonable profits; but the latter are not uniform in amount, partly because there is some tendency to lower investment per unit of output the larger the plant.

In Pennsylvania, during the census year, the average output of gas per plant was 98·8 million cubic feet, and the gross profits amounted to 16·1 c. per 1000 cubic feet of gas sold. The corresponding average profit in Michigan, where the sales amounted to 30·4 million feet per plant, was 16·6 c.; in Iowa, with an average of 18·4 millions per plant, 11 c.; and in New Hampshire, where 16·4 millions were sold per plant, 12·8 c. In contrast with these figures, the gross profit per 1000 cubic feet of gas sold in Illinois was 48·4 c., though the average output per plant there was 177·2 million feet. In Missouri the profit was 48·6 c., and the plant output 104·2 million feet. Maryland saw 128·6 million feet of gas sold per plant at a profit of 57·3 c. per 1000 feet. Gas plants in Colorado sold 69·2 million cubic feet of gas each, on an average, and the gross profit per 1000 feet was 56·8 c. In Oregon, the sales of gas per plant were 13·5 million feet, and the profit was 87·8 c. As these profits are simply averages for all the plants in each State, and as many plants earn only moderate profits, Mr. Adams thinks it is hard to believe that prices in all the plants were reasonable. He finds that low prices do not necessarily imply reasonable prices for gas; and he cites several cases in Massachusetts in proof of this.

Having noted the main causes tending to produce municipal gas plants, Mr. Adams proceeds to give some results obtained by these plants. He takes from the census returns fifteen municipal plants located in nine States. In the census year, the average output of gas by each of these plants was 32·3 million cubic feet, while the average for private plants in all the States was 77·2 million cubic feet each. So that the municipal plants are at a disadvantage as to size in the cost of manufacture. In each of two States—West Virginia and Ohio—the average price charged for gas by municipal plants was 70 c. per 1000 feet, the average output per plant being 107·5 million feet in the former and 37·3 million feet in the latter State. This figure of 70 c. is lower than the average price charged by private plants in any State. Thus, in Pennsylvania, where the average for private plants is the lowest, this price was 83·2 c. during the census year. The average price per 1000 cubic feet charged by private plants in Illinois was 90·3 c.; in New York, 95·7 c.; in the district of Columbia, $1·109; in Rhode Island, $1·15; and in Maryland, $1·252; though the average output of gas per private plant in each of these States was greater than that of municipal plants in any State. For the entire United States, the average price of gas in private plants was $1·04 per 1000 cubic feet, while in the fifteen municipal plants the average was 92 c., though the latter plants had less than one-half as great an average output as those under private management. Leaving the five largest cities of the country out of consideration, the average price charged for gas by private plants was $1·24, or 32 c. per 1000 cubic feet higher than the price of the municipal plants, though the average output per private plant was 34·6 million cubic feet. These lower prices in municipal plants were not the results of selling below cost, except in the case of one small plant in Nebraska, where the price charged was 12 c. below the cost of manufacture. For all the municipal plants in the United States, the gross profit was 29·9 c. per 1000 cubic feet of gas—the cost being 63 c. per 1000 feet. For all private plants the net cost was 72 c., and the gross profit 30·8 c. per 1000 cubic feet. No charge for depreciation, interest, or dividends is included in any of these costs. Investments in municipal plants were at the rate of $3·57 per 1000 cubic feet, and the issues of stocks and bonds by private plants amounted to $8·47 per 1000 cubic feet.

Mr. Adams concludes from these figures that municipal plants are able to produce gas with an investment less than one-half as great per 1000 cubic feet of annual output as the face value of the stocks and bonds issued by gas companies. With these investments, the municipal plants are able to make gas at a less cost, sell it at a lower price, and earn a profit as great as that of much larger private plants. These results are, he says, what the American people want, and are going to have. Such being the general working of municipal gas plants, he thinks it is idle to point to isolated instances that are unfavourable. If gas plants are to remain permanently under private management, he urges that complete records of their operations must annually be made

public. Issues of stocks and bonds must be limited to the fair values of the properties devoted to the public service, and rates for gas must be reduced to a point where, with "honest, efficient management," they yield only a reasonable return on values.

We will now turn to what Mr. Allen has to say on the other side of the subject. He takes the municipal gas-works at Richmond (Va.), which have always been owned and carried on by the city, and, he admits, "generally honestly." Comparing them with private plants in Massachusetts, he finds the investment large—being $3 per 1000 cubic feet of gas sold, with need of considerable expenditure for improvement—and the salaries small, while the wages paid to labourers are high. The consequence is that it is "difficult to obtain the best talent among engineers," and, moreover, the members of the City Council "look on the works as places in which their followers should find situations." He points to the fact that the largest municipal gas-works in America—those at Philadelphia—passed only a few years ago into the hands of a private Company on lease from the Municipality, with the result that there has been a reduction in price to the consumer, an increase in the candle power of the gas, great improvements in the service, good returns to the City and the Company, and the "removal of the influence of the gas-works employees from local politics." There is no evidence that either the consumer or the taxpayer is any the worse off on account of the transfer, but, on the contrary, every indication of his being better off. Mr. Allen acknowledges that there are more municipal gas-works in Great Britain than in any other country; but he urges that it does not follow that the apparent financial success attending their operations would be imitated if the system were followed in American cities. In fact, the different stamp of men constituting the local authorities, and the absence of control by the Central Government, in America, militate against it.

But free as our municipal institutions are from some of the blemishes which characterize those across the Atlantic, Mr. Allen lays stress upon the fact that it is becoming more and more evident that thoughtful men in England are questioning whether the spirit of municipalization is not going too far. He regards as inequitable the practice of making the gas undertaking bear the cost of the public lighting, whereby the ordinary consumer has to pay a higher figure than he otherwise would do. If, he says, a law were proposed to the effect that a special tax should be laid upon consumers of light sufficiently high to produce a sum adequate to pay for lighting the public ways and streets of the city, the Courts would very soon say that this was not just and equal taxation; but when it is concealed under the guise of profits from gas or electricity sold by the Municipality, it is not regarded as taxation.

Coming to question of management, Mr. Allen considers the committee system expensive; and he cites the case of an English city—he is careful not to give the name—having gas-works in three different parts, and sub-committees in charge of each. One of these sub-committees tried an experiment which failed. In the case of a private company, the expense would have ended here; but in the city referred to, each of the other sub-committees felt obliged to try the same thing, with the result that "£10,000 of the gas consumers' money was thrown away on a matter of personal rivalry." Mr. Allen emphasizes the fact that the best-managed works in England are those in which the engineers are given the freest hand, and where neither favour nor politics interferes. Among these, he says, "undoubtedly Glasgow stands at the head;" and to show his appreciation of the way in which this undertaking is conducted, he gives a short history of its purchase, and a general indication of the policy by which it is governed. Referring to the relations of the owners of gas-works to their customers, he points out that it has always been the desire of Parliament that the ability of the management and the consumers should share in the increased profits made; and hence the sliding-scale was adopted. Under its stimulating influence, "processes have been improved and economies introduced into private works," which have been afterwards utilized by municipal owners to cheapen their commodity. At the same time, the lowest prices for gas are charged in places supplied by companies.

Summing up all his remarks, Mr. Allen says that in England, which has had a long experience in the matter, municipal operation is in many places fairly successful, but that in general it presents no advantages over private ownership, and that it is not, save in rare instances, managed so well as private ownership. Skilled engineering talent is not so well paid, but day labourers receive higher wages. In price and quality, there is little or no difference. In many of the larger places, political questions intrude into the employment of labour, and the members of the town councils devote more attention to city affairs and give services free to an extent which is unknown in America. Strikes and labour disturbances have been quite as frequent in municipal as in private works, and scandals and bad management have not been absent. All these things are known in America; and in that country there seems less disposition than in England to treat with fairness capital which has been put into the business, as a comparison of the conditions under which gas and electric light works can be bought by local authorities will show. Again, in England no power exists to fix the price of gas or electric light outside the company; and in the case of companies, self-interest tends to reduce the price, while in the case of municipalities it tends to keep the figure up in those places where the profits of the works—the extra tax laid on gas consumers—are used to relieve general taxation. "The true relation between gas companies and consumers is one of partnership. The consumer should have low prices and the stockholder good dividends; and an inducement towards lower prices should be held out by allowing the energy and ability which by good management enables the making of low prices to share in its work by receiving higher dividends at the same time." This condition of things is secured in the simplest way by the sliding-scale, the operation of which Mr. Allen fully explains. He points out that it has worked successfully in London for thirty years, and in other English towns for a shorter period; that it is self-regulating, and does not demand any interference by Government. The only function which a municipality might properly exercise in regard to it would, he says, be a supervision of the quality and purity of the gas supplied. Such a scheme, "encouraging the investment of private capital and protecting the consumer," is far preferable, in his opinion, to municipal management, with its effect on local politics and expensive operation; and it also obviates the risking of the people's money in enterprises which demand experimental work with the possibility of failure.

THE NEW PARISIAN RETORT-CHARGING MACHINE.

Some Supplementary Points.

NOTWITHSTANDING the care taken in the preparation of the article on the skilfully designed electric turbine retort-charger of the Paris Gas Company, and the aid rendered by M. Bertrand (the General Manager of the Company), by the Engineers whom we had the pleasure of meeting at La Villette Gas-Works in Paris—viz., MM. de Montserrat, Gigot, Euchène, Louvel, Aubrun, and Supplisson—and (in a written communication) by Mr. F. D. Marshall, two or three little inaccuracies crept in which, though not of any great consequence, we prefer to set right, and at the same time give some supplemental information which, it is hoped, will satisfactorily answer one or two points raised in correspondence. The whole of the statements refer to the charger, and not to the electric telescopic discharging-ram, to which, though so interesting, no reference has been made by correspondents.

In the first place, it should be explained that the turbine—which is the main operating part of the charger—runs in a horizontal plane, with a vertical axis; and that the two rotating screws which regulate the feed of coal to the turbine are what are commonly known as worm-screws. The latter point, we think, will have been understood by engineering readers. Then there is a little reduction to be made in the number of revolutions per minute at which the turbine runs. At the beginning of the charge, it is running at 400 revolutions (not 430); and the speed is gradually and uniformly reduced until at the end of the charge

FIG. 1.—THE NEW TYPE OF PARIS ELECTRIC TURBINE CHARGING-MACHINE, GIVING A VIEW OF THE OPERATING AND CONTROLLING MECHANISM.

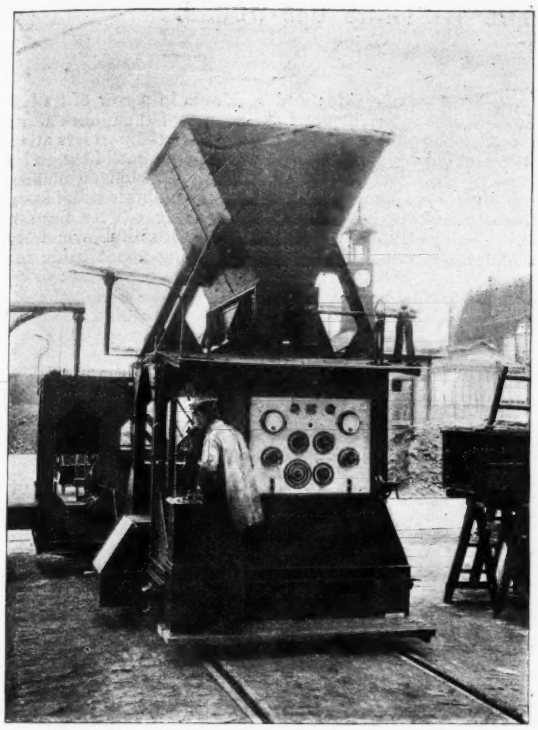


FIG. 2.—ANOTHER VIEW OF THE NEW TYPE OF TURBINE CHARGING-MACHINE.

it is 200 revolutions (not 230). The reason for this reduction was explained last week. The total weight of the charger complete is greater than our only information at the time of writing led us to believe. From Paris, the correction is sent that the weight is 10 tons (not 7 tons), without coal. The coal which was being used at the time of the visit was part French of the Pas-de-Calais and part German. Owing to a little excusable misunderstanding, it was stated in the article that the coke underwent a second quenching after leaving the retort-house. This was wrong; the one quenching just outside the house sufficing. With these small amendments, and a little explanation to be given presently, the article stands as it appeared last week.

Again we have to thank M. Bertrand for supplying us with further photographs which illustrate the charger in the form in which it is now made. The shape of the hopper, it will be seen,

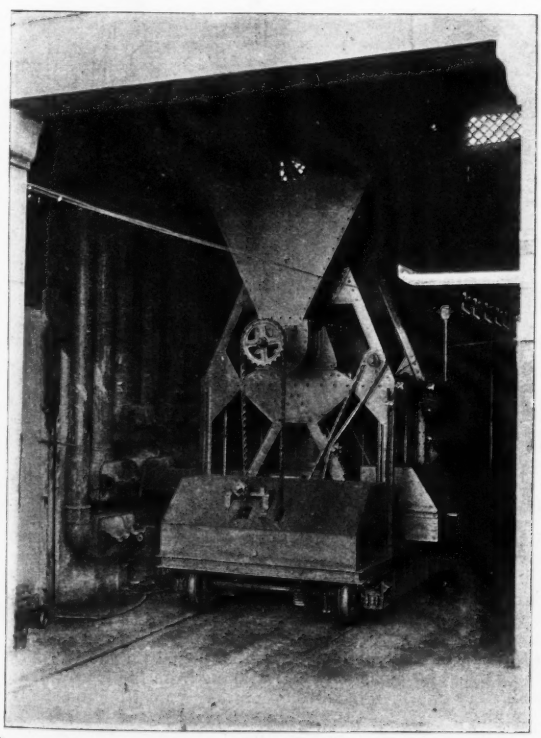


FIG. 3.—THE NEW TYPE OF TURBINE CHARGING-MACHINE IN POSITION FOR WORKING.

has been altered—in appearance certainly for the better, and the change may also have some little effect (though no fault could be found with the regularity of the emission of the coal with the former type of machine seen in operation at La Villette works) in facilitating the delivery of the coal to the turbine. In figs. 1 and 2, a good view is given of the mechanism by which the attendant operates and controls the machines. Just beyond the charger in fig. 2 is seen the rear of one of the discharging-rams. Fig. 3 is a view of the newest type of the charger in position for work. Several interesting points will be observed in these new views—particularly if the memory is refreshed by a reperusal of the descriptive parts of the article published last week.

Now we come to the point in the article on which a little further explanation is needed. In the modest criticism made regarding the introduction of a series of rheostats for automatically slowing-down the speed of the turbine during a charge—and in which criticism (if so it can be called) it was suggested, with some reservation, that this part of the machine appeared to introduce a complication, and might be the seat of inconvenient mishap—it was said that, in the De Brouwer machine, "this automatic introduction of electrical resistances during charging is not found to be necessary." Nor is it. But we must in fairness, the point having been questioned, amplify what was stated. For retorts up to 10 feet long, no adjustment whatever of the speed or angle of the De Brouwer machine is found to be necessary. (If the drawing on p. 523 is studied, the travel of the coal from the machine into the retort will be seen and understood.) For 20-feet retorts, however, there are three simple ways to obtain a perfect layer. One is by running the motor at constant speed, and varying the angle of the machine to the horizontal, which is quite an automatic method. Another is by varying the speed of the belt by automatic cone-pulley driving gear, working from a constant speed motor. A third is by slowing the motor during the charging operation, by moving a simple regulating switch by hand. Experiments that have been made go even farther than this; but we are not at liberty to say more than that they fully substantiate what was said on the point last week. However, this explanation as to the methods adopted in charging retorts with the De Brouwer projector will perhaps satisfy those (two correspondents have mentioned the matter) who were dubious on the point in question.

It is rather distasteful to be driven to saying anything which has the semblance of comparison between these new charging-machines. But one respected correspondent says: "I think you are wrong when you say that the De Brouwer machine can charge a 20-feet retort with the regularity of the Paris machine." It is not our desire to trifle with words; but, after the studied effort last week not to make pointed comparisons as to performance, it must be remarked that the sentence quoted is not one used in the article. Referring to the De Brouwer machine, the simple statement made was: "The level of the charge is all that can be desired." It is not our habit to make statements of this kind without having seen; or, if the information comes through outside sources, this is indicated. Now we extend the previous reference by emphatically saying that the De Brouwer machine can put a charge into a 20-feet retort quickly, well, and without any pause or movement during the charge; and several engineers in this country can bear witness to the truth of this. We can apply the same words to the Paris machine. The Paris machine "can put a charge into a 20-feet retort quickly, well, and without any pause or movement during the charge;" and again English, American, and German engineers have seen the work done at the same time as ourselves, and have been equally favourably impressed. The principles upon which the two machines work are entirely different; and therefore the methods by which *the same result* is arrived at are also different.

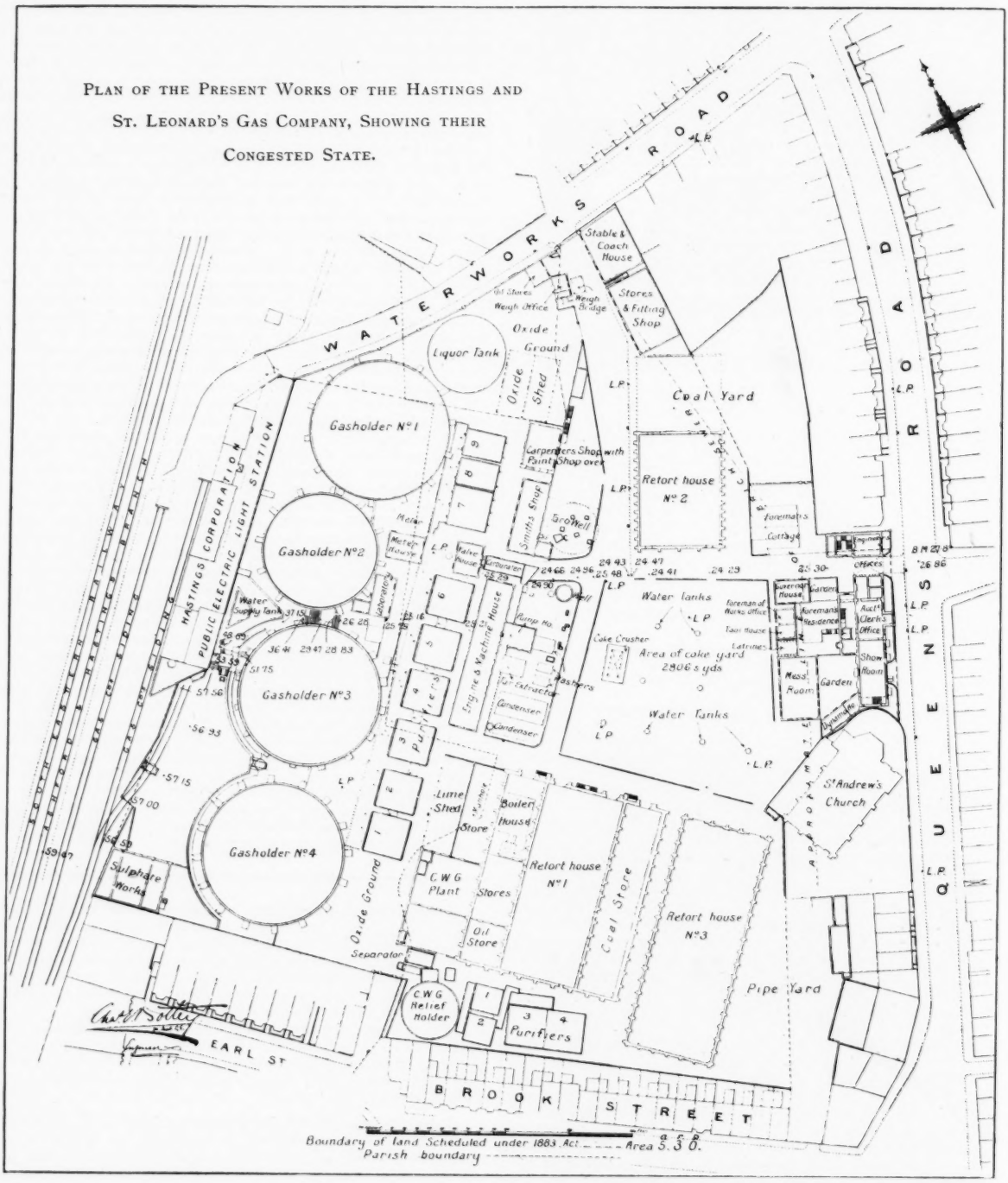
Electrolysis of Water-Pipes.—Electrolysis of water-pipes in Middletown (Conn.) has led to recommendations of the double trolley system. The Board of Water Commissioners, in their report for last year, state that "in granting a franchise for the extension of the single trolley system of street railway, there should be, in addition to the requirement of perfect bonding of rails and a return wire connecting with the bonds, a condition made in the contract or agreement that the electric railroad company shall be responsible for all damages to water-pipes caused by stray currents of electricity from the railway system, and that they shall prevent such currents of electricity from passing on to the water-pipes."

Lighting Small Towns by Acetylene.—Herr J. H. Vogel considers that where a district is compact, no illuminant can compete with acetylene for the complete service of towns containing up to 8000 or 10,000 inhabitants, either as regards lowness of capital expenditure or simplicity in use. The experience already gained shows that a place of 4000 or 5000 inhabitants can be provided with a well-built installation of acetylene for 70,000 marks (£3500), which includes 8 kilometres of mains, 80 or 100 public lamps complete with burners and mantles, 150 meters, supplies to 1500 private burners, a holder storing 100 cubic metres of gas, and heating apparatus for the plant, but excludes the cost of the ground on which the works are built. A coal-gas plant of similar size would cost 160,000 marks (£8000), and an electricity supply station 200,000 marks (£10,000).

THE PRESENT AND FUTURE OF THE HASTINGS GAS-WORKS.

LOOKING from one point of the West Hill at Hastings, a fairly good bird's-eye view is obtained of the existing works of the Hastings and St. Leonard's Gas Company; and if the observer is interested in the gas industry, has any idea of what gas-works are capable of doing, and has knowledge as to what is at the present day accomplished upon that confined 6½ acres of ground, with its medley of buildings and plant, the sight must cause him to marvel and speculate. It is seen that the area is bounded by Brook Street on one side; and residents in a row of its houses enjoy the blissful privilege of gazing out of their back windows on to a carburetted water-gas relief holder, the purifiers attached to the same plant, and the architectural beauties of the end wall of one of the retort-houses. A little further along, a number of the occupants of houses in Earl Street can obtain relief from the monotony of the daily round by studying closely from their windows the engineering features and beautiful symmetry of gasholder No. 4, or (if they know nothing about oxide revivi-

PLAN OF THE PRESENT WORKS OF THE HASTINGS AND ST. LEONARD'S GAS COMPANY, SHOWING THEIR CONGESTED STATE.



fication) muse upon the mysterious kindliness of a gas manager who allows his men to turn from a number of adjacent iron boxes a loamy looking substance on to the ground adjoining the householders' few square yards of garden, and then, by way of recreation, to play with it as children do the sand upon the near sea shore when the tide is out. The eye travels beyond the gasholders (which are built into the slope of the valley, half in and half out of the hill); and there it is seen that the South-Eastern Railway Company's lines set the limits to the gas-works in that direction, besides which an unkind fate has sandwiched between the Gas Company's sidings from those lines and gasholders Nos. 1, 2, and 3, some buildings which were erected for the supply of the electric arc lamps on the sea-front, but abandoned on the Corporation taking over the electricity undertaking from the local Company, the history of which has been recorded from time to time in the "JOURNAL." Against the continued presence of these buildings, the neighbouring gasholders are constantly protesting by rising and falling with dignified deportment. The north end of the site terminates abruptly with Water-Works Road; and the

east, or main, side of the site is bounded by some of the shops in the important thoroughfare known as Queen's Road, the offices of the Gas Company, and St. Andrew's Church, one of the sacred walls of which cuts off a corner of the coke-yard, and ends near to the front-end of retort-house No. 3. Very few gas-works can boast of a church standing in their very midst as in this case. In fact, a more irregular and circumscribed site for a gas-works than this at Hastings, the observer concludes, could not be found in England, outside Ventnor. How Mr. C. E. Botley, the Engineer, has managed to supply from these works 9902 consumers and 1622 public lamps, with, in a year, 433,818,000 cubic feet of gas—the consumption last year—meet 5¾ per cent. increases, and earn for the shareholders 6⅓ and 5 per cent. on their converted capital is a matter upon which speculation cannot be avoided.

But sight-seeing from, and speculation on, the top of a hill do not assist in the solution of a problem of this kind, and so descent must be made to interview Mr. Botley himself on the subject. We went, and succeeded in monopolizing the time of that gentleman and of his son and Chief Assistant (Mr. C. F. Botley) during almost a whole day, hard-pressed although they both are at the present time with not only the ordinary managerial work attaching to a flourishing and expanding business, but with the preparation of plans and specifications for new works at Glyne Gap, and with keeping a close surveillance upon the operations now proceeding there, which, it may be said at once, will be ignored as much as possible in this introductory article, for the reason that several interesting points which cropped up during conversation and an inspection give sufficient matter for an independent article on the present position of the old works.

It was learnt that the site (which by the way is higher by 30 feet at the rear than at the entrance to the works) was not always hemmed in as now. It was at one time, strange as it may seem to anyone who only knows Hastings as it now exists, quite in the open country. But the town has expanded in the same ratio as its popularity as a holiday resort and seaside residential district. Now far away on the north side of the works, and away west along the front through St. Leonards, and a distance inland, houses, large in numbers and size, have sprung up. The works to-day, in fact, rest right in the middle of a thickly-populated area of the town, and an area that is much affected by those who visit Hastings from spring to autumn in search of rest, sea air, and recreation. The works could not extend outwards, and so they have overgrown their accommodation inwards, with the result that a point has now at length been reached at which it is impossible to effect further economies, nor do anything more than maintain the present structures and plant in a state of fair efficiency. Beyond this, increases in the sale of gas to the extent of something like 15 million cubic feet in a year cannot be met indefinitely on a site which was originally intended for plant of much smaller capacity. If the engineer who chose this site some 70 years ago could see Hastings to-day, could see the works now pressed into that site in a manner which has required the utmost wit of his successor now in office to devise, and could witness the remarkable output of gas—both quantity and quality—from the site, his surprise would be great. Not only has the impregnable limits of the works occasioned considerable difficulty, but the site itself has been the source of trouble. It was in times past the bed of an old estuary of the sea, running in a valley, between two hills; and so, as can be readily imagined, the construction of buildings and works—particularly of the gas-holders—has claimed abundant exercise of thought, scheming, and care, and the foundations have been very costly.

An inspection of the works was made in Mr. Botley's company. Glad we were to have him for a guide; for there has been so much intriguing between him and his works that in (to the stranger) the intricacy that has perforce ensued, many of the interesting features—of which the devices resorted to to accommodate the plant to the situation are not the least—would have been missed. There are three retort-houses; and these were in turn visited. It was seen that Mr. Botley has not been able to go in for modern systems of carbonization or mechanical methods of any kind—in fact, it would have been sheer folly to have made the expenditure here, especially seeing that, with the simple plant in existence, good work is being realized. Moreover it would, in some respects, have been a difficult task to improve upon it to any appreciable degree. It was seen that there are no regenerative furnaces on the works—the whole of the houses being equipped with direct-fired settings. When Mr. Botley took charge of the works in 1887, the fuel used was 26 per cent. of the make; and it is now about 22 per cent., while, in some of the intervening years, it has been down to 19 and 18 per cent. This shows that in this regard the margin for improvement is not a great one. The retorts are set in beds of sixes, and are 22 in. by 16 in. by 20 feet oval-dees, and from these upwards of 6500 cubic feet of gas per mouthpiece is being produced per day, or up to 80,000 per through bed of retorts. The houses are altogether too narrow for machinery. As to the wages paid to the men, it was learnt that they are on the same scale as in the case of the South Metropolitan Gas Company. However, in saying all this, we do not want to place Mr. Botley under the imputation of being adverse to improvements. Far from it. It has merely been a question with him of ways and means; and if he could have seen anything that could have been applied to his awkward site—awkward both above and below ground—he would, if sufficient improvement could have been shown to have justified the expenditure on this site, readily have adopted it. It will be seen how far modern methods appeal to him when we come to deal with the new works.

There is one respect in which removal from these works to a more convenient site will bring about a considerable saving, and that is in the reception and disposal of material. The Company's railway sidings at the old works, though so near, are yet so far from the Engineer's reach that the cartage of coal from the sidings into the works costs him no less than 9d. per ton—to say nothing of the great inconvenience. Plan after plan—and easy ones too—have occurred to Mr. Botley for connecting these elevated sidings with the retort-houses and coal-stores; but when the cost has been counted, it has always been found prohibitive, and it would undoubtedly have added to the complication of the already congested yard. In his peculiar circumstances, Mr. Botley has found a carburetted water-gas plant, of some ¾ to 1 million cubic feet capacity per day, so invaluable that, whatever his position may be in connection with his new works, he would be loth to forego the comfort and convenience that he has become accustomed to experience from the possession of this plant. On an average, he uses 27 per cent. of carburetted water gas. In this plant, we find another evidence of his crowded state. There is no situation available for an oil storage tank as is usual with such plants; and so a number of large cylinders, each capable of holding 10,000 gallons, have had to be installed in a building adjacent to the water-gas plant and No. 1 coal-gas retort-house. For safety, these oil-tanks can be easily isolated; and there has been no trouble with them.

Walking into one of the boiler-houses, it was almost amusing to see how every nook and corner had been utilized by the Engineer. At the back of the water-tube boilers were found perched upon staging a water-tank, a Chevalét-Boby water-softener, a Burymead water-heater, a Green's economizer, and alongside the boilers are several small pumps. Glancing into the machine-shop it was found to be well equipped; the Company having in Hastings to be self-dependent in the matter of repairs. Taking a run round the condensing and purification plant, economy was seen to have been carried to the extent of making up a condenser from ordinary pipes, which can afterwards be used again for other purposes; and very efficient it is found to be. It is unnecessary to mention the whole of the plant; but it was noticed that, its crowded state notwithstanding, Mr. Botley has, by careful arrangement, succeeded in keeping it all so that it is readily accessible for cleaning and repairs. There is, however, one point which the mention of purification reminds us of. When the Company went to Parliament in 1883, they were placed under the sulphur clauses. Although this is a great nuisance to the Engineer and a source of anxiety, one cannot, so far as cost is concerned, say anything in opposition to it, in view of the figures which Mr. Botley produced for our satisfaction. The cost is now under an average of ½d. per 1000 cubic feet of coal gas sold (a little higher for the carburetted water gas); and the total amount is less than when the Company were sending out half the quantity of gas. The system of purification adopted is mainly by lime boxes, worked on the rotative principle. These are aided by air, with oxide boxes as catches, and supplemented as necessity requires by oxide boxes in front of the lime. With this system, Mr. Botley, it was seen from his records, has been very successful in complying with the onerous restrictions imposed upon the Company in 1883. Here are a few of the figures, showing the averages of tests placed in comparison with those for the corresponding year a decade previously: 1898, 7·11 grains per 100 cubic feet; 1888, 10 grains. 1899, 6·76 grains; 1889, 13·77 grains. 1900, 8·70 grains; 1890, 18·25 grains. 1901, 9·72 grains; 1891, 13·6 grains. 1902, 10·03 grains; 1892, 13·55 grains. Although this system of purification is so successful in effecting its purpose, it is said to entail considerable anxiety, and, besides, a large number of boxes, which, in turn, involves greater capital expenditure than would otherwise be the case. But surrounded as the Company are by houses in which large numbers of visitors to Hastings are entertained through many months of the year, it is imperative for the maintenance of the Company's good name, and in the interests of the district, that purification shall be conducted absolutely without nuisance.

Not far from the purifiers was found the apparatus which the Messrs. Botley designed some years since for the carburation of gas, for the prevention of the deposition of naphthalene in the distribution system. This apparatus by the way has not been very rapidly adopted in other places. But it is gradually receiving greater recognition; and now that towns like Bournemouth, Portsmouth, Southampton, Croydon, Cheltenham, and Burslem have it in use or in course of erection, we ought soon to hear of independent experience, against the disinterestedness of which no one can carp. The apparatus has been in use at Hastings for some six or seven years; and there the old terror and evil has been completely expelled. It must not be expected that the use of this plant will effect an immediate cure. It has at the outset a double duty to perform—in the first place, to prevent the further deposition of naphthalene; and, in the second, to clear away the accumulations of the past. Its effect is a gradual one; and, after the cure, the sole duty of the apparatus is that of a preventive of further trouble. Other than at Hastings, we have seen figures bearing out this point.

As the plan shows, there are four holders on the works; and in

the case of two of them the top lifts run out of the guide-framing. The total capacity of the holders is about 2¼ million cubic feet. They were erected by Mr. Botley; and it needs only a superficial glance to see the difficulties he had to encounter in constructing them half in and half out of the hill on the west side of the works. The tanks are of cast iron; and in the case of two of them strong retaining-walls had to be built from the foot of the hill. In a room near by are concentrated the gasholder valves, so that they are all under control at one point.

The mention of the word "control" calls to mind the peculiar character of the district which the Company have to supply. It is one which demands very serious attention and skilful manipulation in order to maintain something approaching a concordant pressure throughout the district. The area may be described as a level line extending along the sea-front, with alternate hills and valleys running back from it from end to end to a ridge, which again has other valleys beyond. We have borrowed from Mr. Botley an interesting diagram that was seen in his office, which graphically shows the diversity of the levels in the district. Although bearing but indirectly on the subject, a second diagram

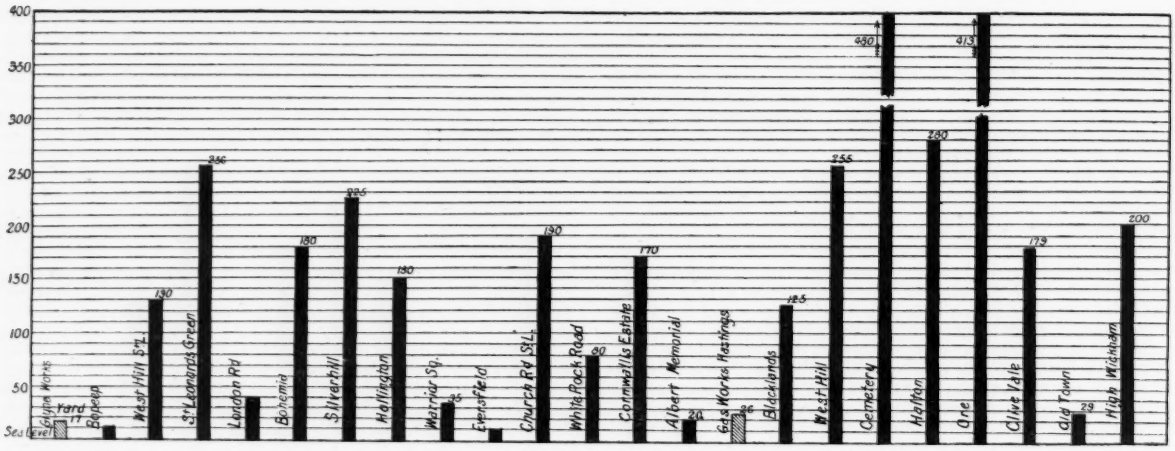
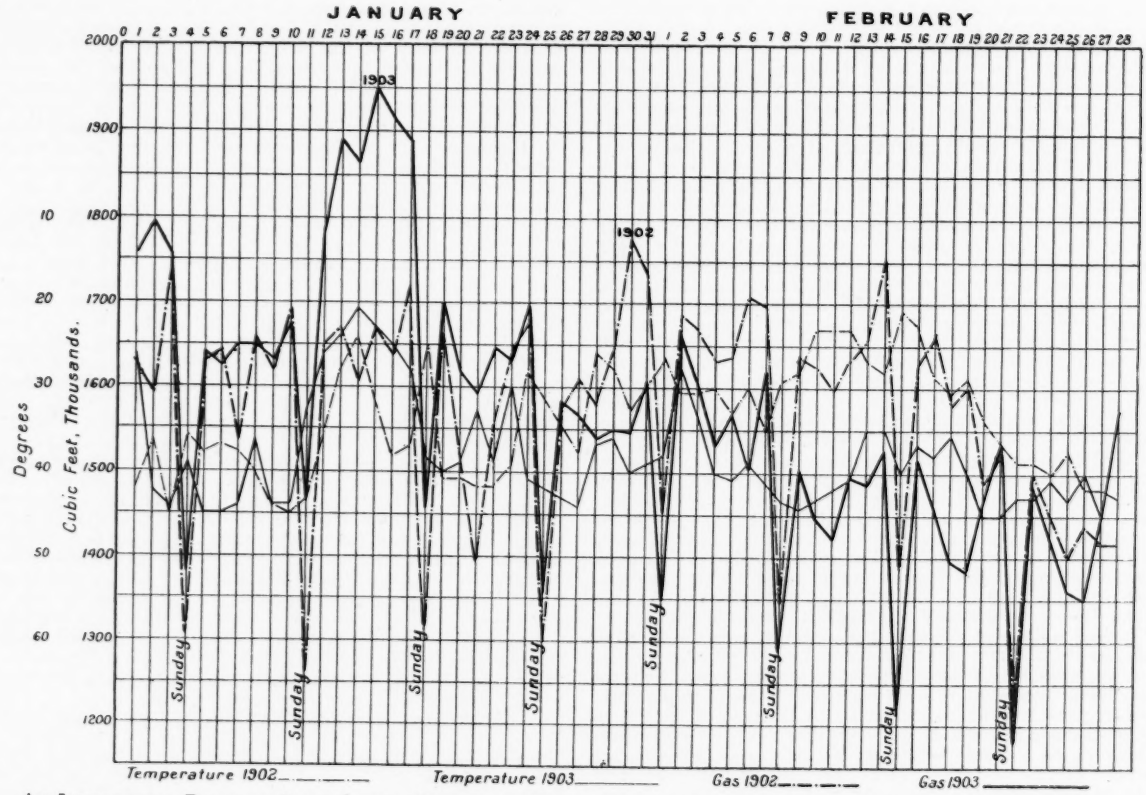


Diagram Showing the Large Variations of Height Met with in the Supply Area of the Hastings and St. Leonard's Gas Company.



An Interesting Diagram, Showing the Effect of Temperature on Consumption at Hastings in January and February Last.

may also be included in this article. Mr. C. F. Botley has been turning his attention to the question of the effect of temperature on gas consumption; and the diagram, showing some rather startling rises and falls in consumption with the drop and ascent of the thermometer last January and February, in comparison with the corresponding months of last year, is one of the results. It tells its own interesting tale without comment.

The works also comprise fitters' and carpenters' shops, a laboratory and photometer room. The Company's offices were also found worthy of a visit. They really form a prominent feature of Queen's Road, were built (all but the small central portion) some ten years since from Mr. Botley's designs, and will remain, on the cessation of manufacture at the old works, the centre of the Company's business operations. In them there is ample accommodation—especially after a little internal structural alteration has been made—for the whole of the Company's administrative work and show-rooms. The outdoor fitting department is now a big thing. It is not many years since that employment could only be given to some five or six outdoor fitters; but so great has been the development that there are now something like fifty men constantly occupied. "We undertake any kind of gas and electric-light fitting," said Mr. Botley, "and will maintain anything in connection with gas consumption or electric lighting, so long as it means business." Walking round the show-room, it was noticed that the glass cases

were lighted internally by electric incandescent lights; and it was explained by Mr. Botley that they do this to demonstrate to people that the Company are prepared to fit their cases and windows up in the same way where the use of gas direct is not possible. This undertaking of the dual fitting is found to pay, as the Company are able, by their advice, to exercise a little influence as to the number of electric lights and gas-lights to be installed, when a change is desired or new premises require to be fitted. Naturally, if the electric light people were the only advisers when gas consumers take a fancy to electric light, they might influence the total rejection of gas for electricity. Thus the double business is found to pay, not only in the way of the profit it may bring, but in the saving of custom that it effects. The Company have a compact little electrical plant of their own; and they have it installed, on the three-wire system, throughout the works in those parts where naked gas-lights would be dangerous. No gas-works, in Mr. Botley's opinion, should be without an electrical installation—not only from the utilitarian point of view, but for demonstration and experimental purposes. The plant is what is known as a 10 kilowatt set, driven by a Crossley P. E. high-speed engine. The dynamo is a Crompton, and is a nice piece of work. In addition to its use for lighting parts of the works at night time, the Company do a little business with the plant in the way of charging storage batteries for motors and medical purposes. However, the great point about this plant—apart from its usefulness on the works and the practical experience it has brought the Company's engineering staff—is the beneficial way it has assisted in the work of meeting the competition of electricity in the outside district, and generally in developing the outlets for gas consumption.

This account of the old works and the many interesting things seen there is not by any means intended to be a complete description; it is merely a cursory view to serve as an introduction to the articles which will succeed this one. The works have been rebuilt over and over again; and the last time they were re-arranged by Mr. Botley, it was thought that the Company would be able to stop there for several years beyond the present. And so they will, but only in a modified way. In 1899, the Company were compelled to go to Parliament with a Money Bill; and as it was about as certain then as anything could well be that there would be a good deal of opposition to the manufacturing works remaining in their present position, the opportunity was taken to secure powers for the purchase of a new site at Glyne Gap along the coast towards Bexhill. Under the Act, the Company are obliged to cease to manufacture gas on the existing site within a period of ten years from the passing of the Act—that is to say, before 1909. As a matter of fact, they will do so some time before. The holders will remain as at present, so will the offices, and as much of the site as may be required for the work of the distribution department will also be retained at Queen's Road. As to the remainder of the site, Mr. Botley has been scheming how it can be most profitably employed for building purposes; and an examination of his plans convinces one that—in view of its central and valuable position—there is money to be made from the old site yet.

As previously remarked, the Glyne Gap site, and the work now proceeding there, is being reserved for succeeding articles; but there are two points which—the one from the consumers' point of view, and the other from the shareholders'—stand out with pleasant prominence in connection with the change from the old to the new site. The first is that as soon as the bulk of the manufacturing operations have been discontinued on the present site, the Company have to reduce the price of gas by 1½d. per 1000 cubic feet. But, inasmuch as they will by the removal of the works be relieved from the obligation of paying the borough dues on coal—now amounting to 2s. 4½d. per ton—the concession in the price of gas will be more than counterbalanced by the abolition of the dues. Over his future escape from them, Mr. Botley is to be heartily congratulated, and equally so upon what he has been able to accomplish for the Company in spite of the imposition. The unloading, too, of his coal and its transference into the works have been more costly at the old works than will be the case at the new—in fact, the cost of depositing coal in the retort-house at Hastings from the Tyne has cost the Company no less than 11s. per ton, including freightage, railway rates, town dues, and unloading, in addition to the cost of the coal. The Company have bought coal as cheaply as anybody; but they have always laboured under this burdensome disadvantage. Before the great rise in the price of coal took place, and the price of gas was reduced, coal was only costing the Company 6s. 3d. per ton at the pit's mouth. Since then it has been 16s. 6d.; and last year it was 10s. 6d. Add to these figures the 11s., and then will be seen the drawback under which the Company and Mr. Botley have laboured, but even then successfully. The price of gas to-day is 3s. per 1000 cubic feet; and the economies which will accrue from the new works, and the saving of the town-dues as mentioned, bring (other things remaining favourable) the foreshadowed further reduction of the price within measurable distance.

The success that has attended the Company under their peculiar circumstances—works and otherwise—is simply the fruit of internal improvement, scheming, rigorous supervision in order to obtain the utmost out of conditions far from the most favourable, and of constant effort to make the business penetrate into new quarters and develop in the old ones. Prosperity has attended these efforts, notwithstanding, too, the competition of the electric light. It seems almost incredible that twenty years have past, and yet it is so, since the electric light was introduced into the town by the original Father Brush. Then—in 1883—the quantity of gas sold was 198,634,500 cubic feet. The competition has been continued by the Corporation; but by last year the sales of gas had advanced to 433,819,000 cubic feet—an increase, since the advent of the electric light, of no less than 118 per cent. This fact will have particular interest for the gas industry; and with such a figure before them, as the result of twenty years' competition, the shareholders of the Hastings and St. Leonards Gas Company can afford to emphatically say—"Let electricity go on competing."

This brings us to the second prominent point which has special interest for the proprietors, and is again a striking tribute to good management in the face of retarding influences. This point was recognized and commented upon by the Chairman of the Company, Dr. G. G. Gray, J.P., when addressing the proprietors at the last half-yearly meeting; and we cannot do better than put the matter practically in his own words. The Doctor was speaking of the new works at Glyne Gap, and of the postponement by the Directors of the raising of new capital until an opportune time; and, in doing this, he remarked: I hope the proprietors will bear in mind that the ground has been paid for, and the trunk pipe-line, costing £23,000; and that the total sum of £52,000 has been expended without the raising of a penny of the fresh capital. This expenditure is still unremunerative; but the Company have been able to maintain their position completely. Furthermore, including all the money spent on the new works, the capital does not exceed, per 1000 cubic feet of gas sold, what it was when Mr. Botley first took charge of the works in 1887. This is an acknowledgment of good service which, we venture to say, was and will continue to be prized by the Chief Engineer of the Company. It may be of interest to add that in 1888, the capital was equal to 14s. 3d. per 1000 cubic feet of gas sold; and in 1898, it was 12s. 9d. Last year it was 14s. 7d., including the capital expended in connection with the Glyne Gap works (£52,362), or, excluding that sum, it was 12s. 2d.

In the course of this article, we have fully shown the complete justification which the Directors of the Company and Mr. Botley have at their backs for the important step they are taking in erecting the large new works at Glyne Gap, and in abandoning the manufacturing portions of the old ones. They, the proprietors generally, and the Engineer will, we are certain, have every reason to be gratified with the result. To the Glyne Gap works (of which Mr. C. F. Botley is the Engineer-in-Charge under his father) our next article will take us. It will engage interest in what is to succeed by mentioning that Mr. Botley's estimate for the first section of the works now in hand, and to be described, is, in round figures, £100,000.

THE COMPARATIVE LIFE OF HORIZONTAL AND INCLINED RETORTS.

Mr. Alfred Colson, of Leicester, writes on the above subject as follows:—

I have pleasure in complying with Mr. Herring's suggestion that those interested in this question should give data with reference to the life of retorts and coal carbonized. The following are the particulars relating to Leicester. The retorts are of ordinary plastic clay from Stourbridge.

Aylestone Road Works.—Size, 22 ft. by 22 in. by 16 in.; weight of charge, 4¼ cwt. per mouthpiece, six-hour charges; weight of coal per 24 hours per mouthpiece, 17 cwt.; total weight of coal carbonized during 1500 working days, 1275 tons per mouthpiece, which equals 116 tons per foot, or 1 cwt. 2 qrs. per foot per day.

Belgrave Gate Works (the settings are of various sizes, but the following particulars apply to the largest retorts).—Size, 21 ft. by 24 in. by 16 in.; weight of charge, 4½ cwt. per mouthpiece, six-hour charges; weight of coal per 24 hours per mouthpiece, 18 cwt.; total weight of coal carbonized during 1800 working days, 1620 tons per mouthpiece, which equals 154¼ tons per foot, or 1 cwt. 3 qrs. per foot per day.

In studying this subject, I do not think we shall all quite agree with Mr. Herring's inference that the quantity of coal carbonized is the only factor to be considered, inasmuch as from some coals the gas is so much more freely eliminated than from others, resulting in shorter charges and therefore a larger quantity of coal carbonized in the same period of time.

The "Lutz" petroleum incandescent lamp is well spoken of in the current number of the "Petroleum Review.' A lamp of 200-candle power consumes in ten hours about 5 litres of petroleum, at the cost of 14 c. per hour.

On the occasion of his recent visit to Scotland His Majesty the King was graciously pleased to create Mr. James Steel, the Lord Provost of Edinburgh, a Baronet. As Lord Provost, he is Chairman of the Edinburgh and Leith Gas Commission. A similar honour was conferred by His Majesty upon Lord Provost Primrose of Glasgow.

THE GRANTON WORKS OF THE EDINBURGH AND LEITH GAS COMMISSIONERS.

DESCRIPTION PREPARED

BY

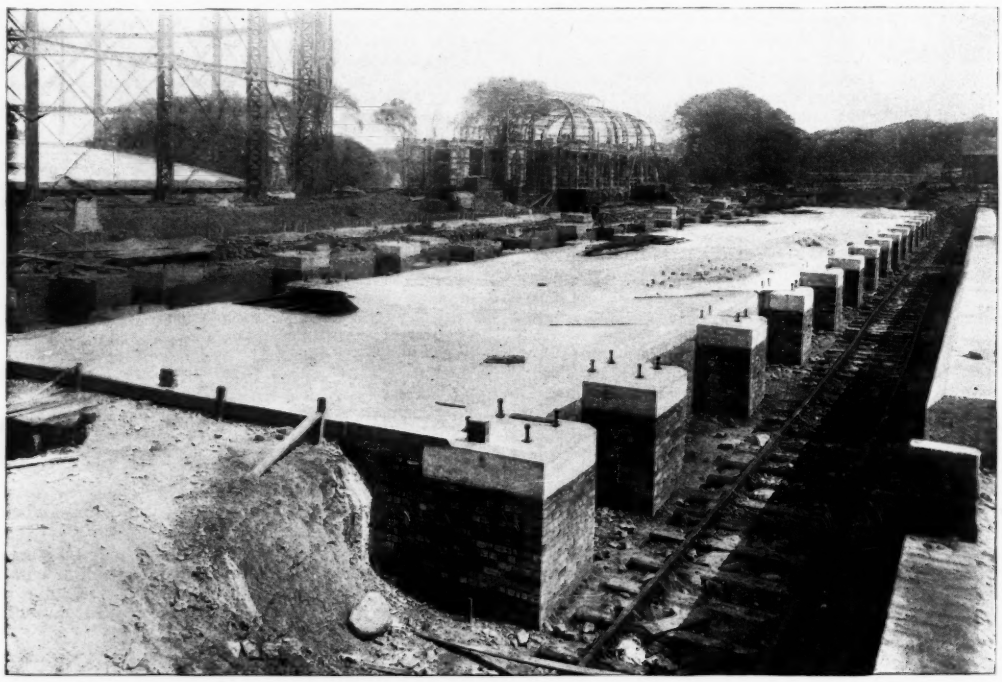
WALTER RALPH HERRING, M.INST.C.E., *Engineer.* *

ARTICLE XX.—Accompanied by Plate No. 21, illustrating the Arrangement of the Foundations and Connections for the Purifiers, wit Longitudinal and Transverse Sections.

After carefully weighing the disadvantages and the advantages of the water-lute type and the jointed cover (Green's type) of purifiers, the conclusion I came to was that the water-lute type offered the greatest advantages upon all points excepting that of structural cost; and as this only promised a saving of 12½ per cent. on the capital outlay—in my own case, representing a sum of £1155, the interest and sinking-fund charges on which would amount to a saving of £46 4s. per annum—I was of opinion that a great deal more than this would be spent in labour in manipulating the material into and out of the boxes, in addition to the increased cost of making and remaking the joints of the covers of the boxes. The water-lute type was, therefore, adopted.

The purifiers consist of two complete sections, each of six boxes. Each box is 45 feet long by 30 feet wide; and each section is divided into a set of four, actuated by an eight-way "Weck" valve, and two catch-boxes, actuated by a four-way valve of the same type. The purifier tanks are continuous, having division plates with a double lute common to two boxes.

The question of the relative position of the purifiers in regard to the ground-line was also carefully considered; and by placing them on the upper floor, the means of rapidly discharging the boxes through ports in the bottom possessed considerable advantages, and only necessitated the elevation of the material to a slightly higher level for charging. The structural cost of supporting such a mass of ironwork is, however, of very considerable importance; and the question arose as to whether some mechanical means could not be devised for discharging the purifiers on the ground-line, which would work out at considerably less cost than the supporting of the boxes upon girders overhead. Such



PHOTOGRAPH No. 103.—General view of finished foundations for purifiers.

a method was ultimately found to be feasible, and has been duly installed and will be referred to later on. It was, therefore, determined that the purifiers should be placed on the yard level.

Plate 25 is a plan of the arrangement of the foundations and connections for the purifying plant—see also Photograph No. 103. On reference to the transverse sections on the lower part of the plate, the formation of the foundations, including the pipe trenches, will be seen. The original surface-line of the ground is shown dotted through each transverse section. The portion on the right-hand side, on top of the retaining wall, is the extreme northern edge of the coke-yard.

On either side of the two lines of purifiers, a low-level railway has been provided, at such a level as to keep the tops of the waggons at a point sufficiently below the top of the side-plates of the purifiers as to allow of the material coming from the boxes being discharged down shoots into the waggons. This formation on the south side, with a retaining wall, is also purposely arranged to afford easy facilities for loading coke from stock; the low level alongside the purifiers being used as a dock for this purpose.

The purifiers are arranged in two continuous lines, with a central gangway about 22 feet wide; this central gangway being the pipe and valve track for both sections of purifiers. To avoid unnecessary excavation and expense in leading the pipe-connections to the bottoms of the purifier-boxes, a cavity has been arranged immediately beneath the boxes; and the pipes and the valves are taken in and connected to the bottoms of the boxes at the nearest point, as will be subsequently explained.

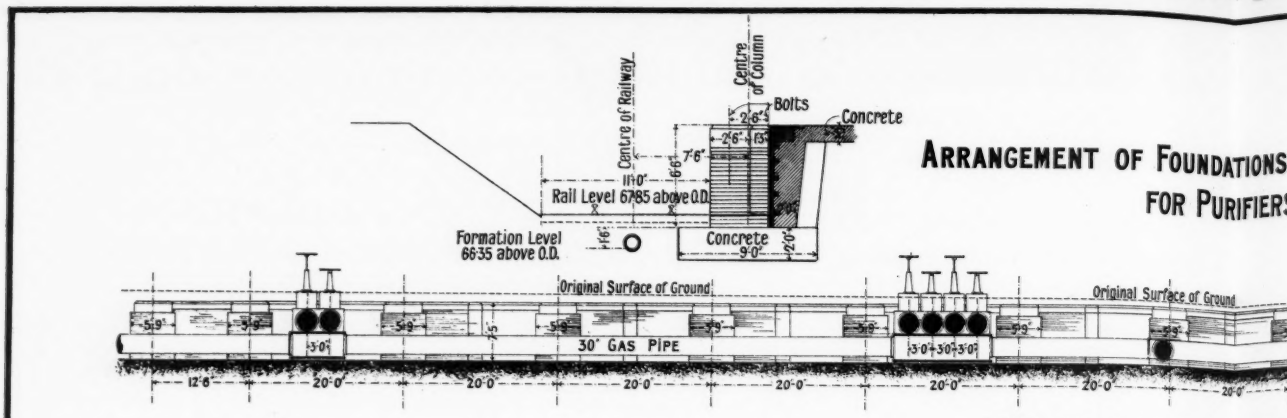
The gas is distributed over the bottom of the box (inside same) beneath a cast-iron troughing. This arrangement is worthy of particular consideration, not only from an economical point of view, but also from the fact that every joint in the purifier connections, as shown, is easily get-at-able, and the distribution of the gas in the boxes is found to be as equally satisfactory as the former arrangements when the inlet and outlet were kept as wide apart as possible.

The central pipe-track as well as the low-level beneath the railways on either side, is properly drained beneath the formation level by means of a 9-inch fireclay drain pipe—not only the surface water but also the rain water from the building, as well as the effluents from the overflows of the purifiers. The syphon-pots on the valves are all connected therewith, and are ultimately joined up to the main drainage system, passing the western end of the block. The drain has been laid to such a level in the first instance as to permit of this being done.

The construction of the foundations for the purifiers will be pretty clearly understood upon reference to Plate 25. The original formation of the land is indicated in dotted lines on the transverse sections on the lower portion of the plate. When levelling the site, a large steam crane and grab were used, running upon a

* All Rights of Reproduction Reserved.

The Granton Works of the Edinburgh

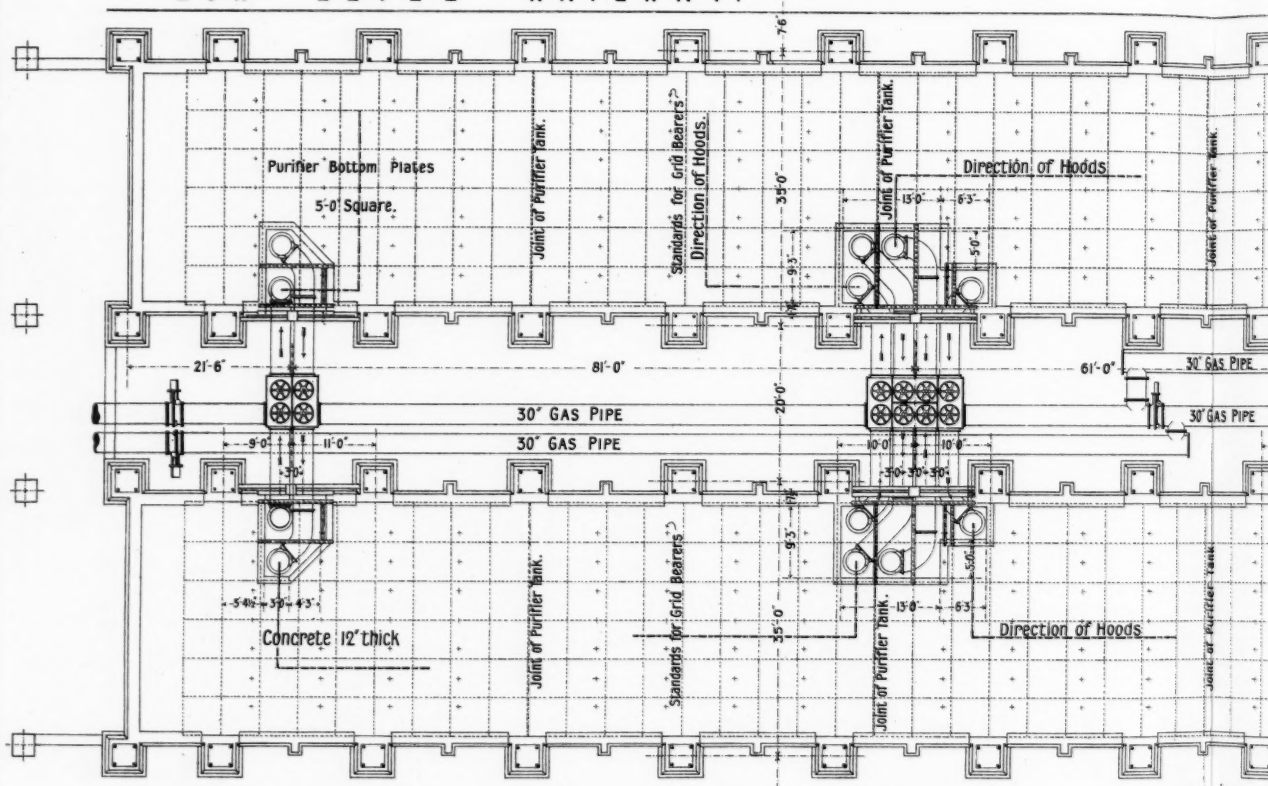


ARRANGEMENT OF FOUNDATIONS FOR PURIFIERS

ELEVATION SHEWING VALV

EMBANKMENT.

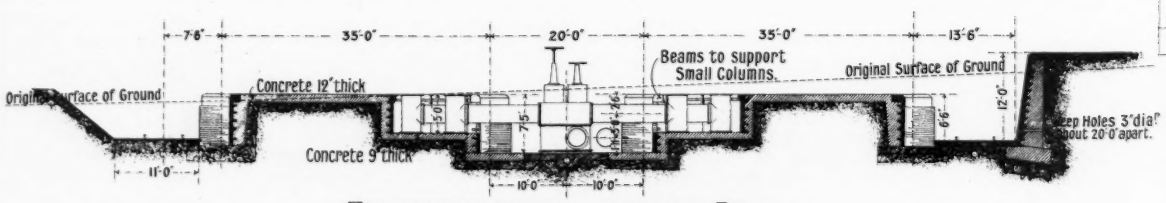
LOW LEVEL RAILWAY.



LOW LEVEL RAILWAY. PLAN.

RETAINING WALL

HIGH LEVEL RAILWAY.

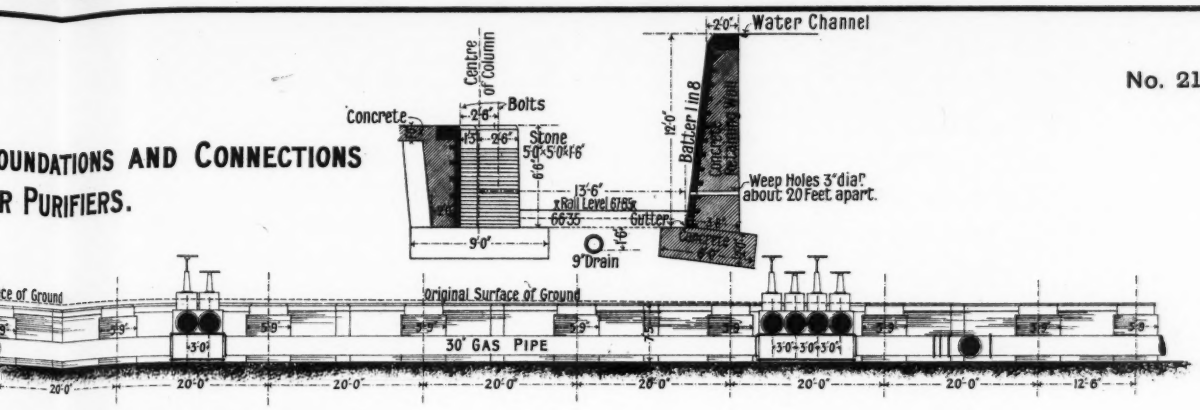


TRANSVERSE SECTION THROUGH PIPE TRENCHES.

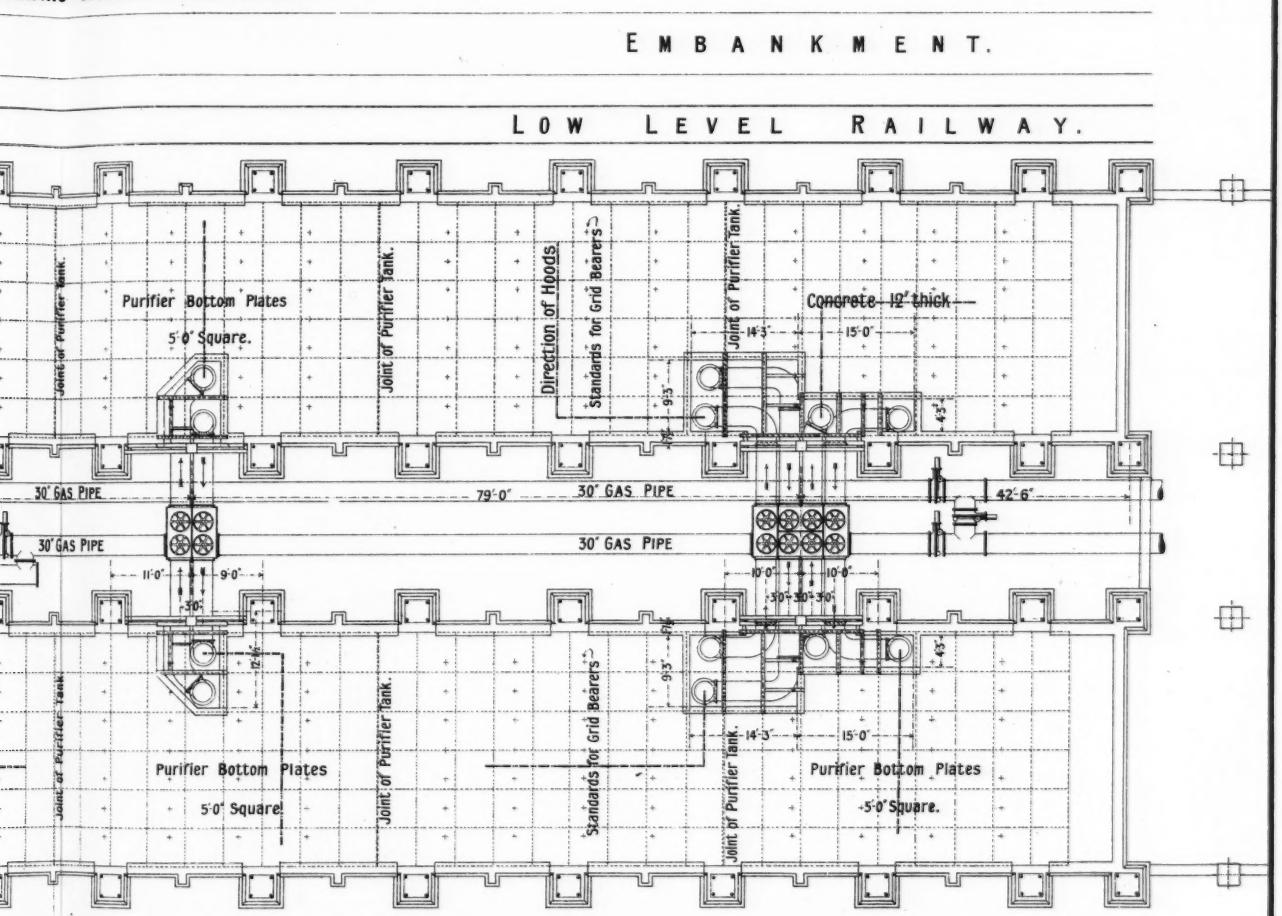
Copyright at Stationers' Hall.

No. 21.

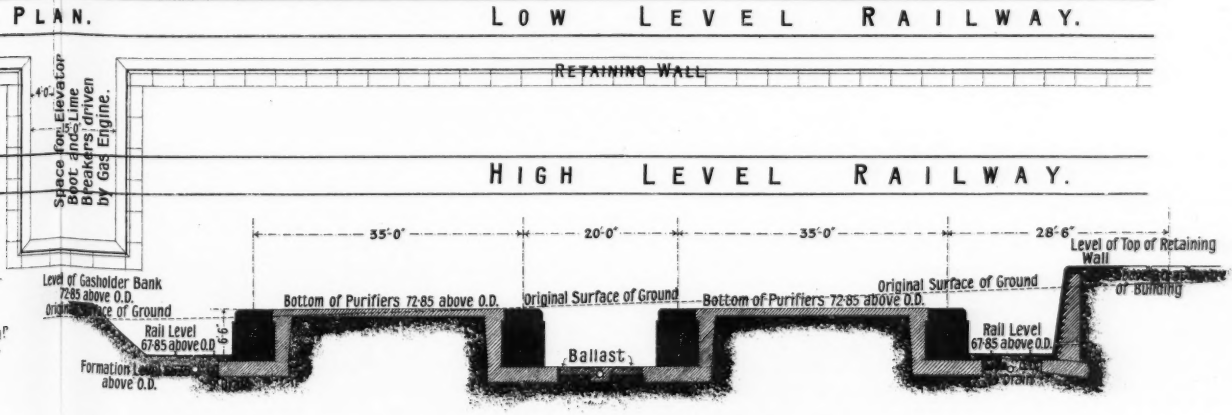
OUNDATIONS AND CONNECTIONS
R PURIFIERS.



HEWING VALVES AND PIPES.



PLAN.


LOW LEVEL RAILWAY.
RETAINING WALL
HIGH LEVEL RAILWAY.
Space for Elevator Boot and Lime Breakers driven by Gas Engine.
Level of Gasholder Bank 72.85 above O.D.
Rail Level 67.85 above O.D.
Bottom of Purifiers 72.85 above O.D.
Original Surface of Ground
Ballast
Level of Top of Retaining Wall
Drain

TRANSVERSE SECTION THROUGH PIERS.

WALTER RALPH HERRING,

M.INST.C.E., *ENGINEER.*

temporary line on a 4 ft. 8½ in. gauge railway. Some portions of the surplus earth were removed by the contractor for the gas-holder tank, for the formation of the embankments—the Commissioners themselves carrying out the foundations for the purifiers. As soon as the whole site had been levelled to the minimum depth necessary for placing in position the main bed of concrete beneath the purifier boxes, the construction of the retaining wall was proceeded with. It is constructed of concrete with a brick face—suitable weep-holes being left at different levels for the release of accumulated water from the back. The wall has a total depth at the centre, from foundation to top, of 12 feet. It is 3 ft. 6 in. wide at the base, and 2 ft. wide at the top. The concrete foundations for the wall are 6 feet wide by 2 feet thick, laid at right angles to the line of the face of the wall; the wall having a batter of 1 in 8. The wall is coped with stone from the works quarry, 2 feet wide by 12 inches thick.

Immediately after the consolidation of the retaining wall, the formation for the laying of the low-level railways was proceeded with, by excavating to the required depth by means of a steam crane and grab working on the railway on the upper level. This excavated and loaded the surplus earth into ballast waggons on the line on the low level, continuing as the cutting proceeded. As

PHOTOGRAPH No. 104.—Illustrating brick encasements for column piers and dwarf retaining walls.

PHOTOGRAPH No. 105.—Column piers and dwarf retaining walls forming sides of purifier foundations.

soon as this was completed, the steam-crane was brought on to the low-level railway, in order to proceed with the excavations of the central gangway dividing the two lines of boxes, and forming the pipe-track between the boxes.

Above the ground level on the concrete foundation, a brick encased concrete construction was then followed throughout (see Photograph No. 104); brickwork being used on all exposed vertical faces of these foundations.

Photograph No. 105 shows the piers partly constructed, with the frames for securing the foundation bolts set in position, together with the cavity underneath the purifier boxes to permit of the main-pipes being connected to the bottoms of same. In fixing these frames, the greatest care had to be exercised in preserving their exact levels and alignment. The concrete was first brought up to a level with the underside of the bolt-heads, and allowed to become hard, so as to prevent subsequent sinkage. The foundation plates were then threaded upon the foundation bolts; the former consisting of flat plates laid in the form of a cross, having square holes punched through them for receiving the square necks of the foundation bolts. Thereafter a wooden template, exactly fitting the bolts, was threaded over the four bolts, and left upon the foundation plate. Each bolt then had passed over it a wooden tube or box, 4 inches square, giving an internal clearance of 3 inches. On the upper part of the bolt-heads, another template was passed over the bolt-ends and lightly nailed to the boxes upon the bolts. The four boxes were then stayed by wooden cross-bracings, and finally set in their exact positions. The bottoms were thereafter secured with a little cement mortar, when once their exact position had been determined. A veneer of brickwork was then laid, and the intervening space filled in with concrete in and around the templates. Some little care was necessary to see that the bolt frames were not disturbed until they had been secured in a foot or two of concrete. Thereafter it was impossible for them to get out of position.

This method of securing the foundation bolts in the concrete foundations was practised throughout the works, and is considered to be a much more satisfactory method than the ordinary custom of leaving a pocket at the base for inserting the bolts and foundation plates after the foundations are formed. This latter practice, of necessity, weakens the structure.

Photograph No. 106 shows the foundations for the central trench almost completed, together with the concrete base-stones

PHOTOGRAPH No. 106.—Column piers and dwarf retaining walls together with base-stones and concrete bed for purifiers.

PHOTOGRAPH No. 107.—Brick encased concrete work in process of execution.

in position on one side. To the left hand of the photograph, steel joists supporting the bottom plates of the boxes over the pipe cavities are also shown. Between the piers, and forming a retaining wall for the earth left in between the level of the underside of the concrete underneath the boxes and the low level railways, concrete encased with brickwork, as shown in Photograph No. 107, was employed. Thereafter a bed of concrete stretching from side to side (see Photograph No. 103), and of the full length, was laid, perfectly true and level, upon which the cast-iron bottoms of the boxes were placed—a thin bedding layer of sand being first laid down.

The cap-stones on the tops of the main piers, for supporting the columns of the buildings, are made in concrete cast in moulds, and weathered for a period of about twelve months prior to use. They have cost (including labour and materials) at the rate of 11·849d. per cubic foot, or 37s. each. Stones for a similar purpose would have cost at least 5s. per cubic foot. It may be here remarked that the concrete ones have proved to be a most excellent substitute; a few spare ones that were left having been cut up and worked for other purposes in just the same way as very hard stone.

The composition of the concrete used in the body of the blocks was four parts of broken stone to one part of fine granite peas and one part of portland cement, with a facing worked in simultaneously with the mass, composed of "Granolithic," consisting of two parts of fine granite peas to one part of portland cement. The coping of the intervening retaining walls forming the edge of the concrete bed under the purifiers, was also partly laid in this manner by cast blocks. It was subsequently found, however, that an equally satisfactory job could be accomplished upon this portion of the work by laying the coping *in situ*.

ELECTRIC LIGHTING MEMORANDA.

The London County Council Favour Electric Supply Companies in Preference to Trading Municipalities—The Sad Case of Poplar—The General Insolvency of Municipal Electricity Undertakings.

THE affection of some municipal bodies who profess a belief in trading with ratepayers' money, for other bodies who do the same thing, is not carried to an unreasonable length. The London County Council would occur to most people as representing in the Metropolis the cause of municipal trading; and the Council of the Metropolitan Borough of Poplar are conspicuous among those Metropolitan Local Authorities who have conferred upon their districts the blessing of municipal electricity supply. If there is anything in the "principle" of municipal electric lighting, as some politicians and journalists professing the cult of Progressivism are accustomed to proclaim that there is, there should be no doubt as to the source from which any supply of electric power ought to be obtained in the neighbourhood of Poplar. There is in this locality a tunnel beneath the River Thames, connecting the northern shore with the southern, at Greenwich, which is under the control of the London County Council. Electricity being required for working the lifts and for lighting this tunnel, one end of which is in the Poplar district, it might be thought that this supply would have been provided by the Poplar Borough Council as a matter of course. Indeed, so long ago as April, 1901, a contract with this object was made between the Borough Council and the London County Council, the price for the current being 1·8d. per unit for a minimum quantity of 100,000 units per annum. Plenty of time was allowed for making the necessary arrangements; the lifts not being completed until November last. It was then found that the supply was insufficient; and, after a good deal of annoyance had been caused by the failure of the lifts, they were put out of use indefinitely.

Across the river there was no municipal electricity supply, but there were two electric lighting companies—the London Electric Supply Corporation, Limited, and the Blackheath and Greenwich District Company. Admirers though they might be of municipal enterprise, still the London County Council needed electricity which could be depended upon to work the lifts and light the tunnel efficiently. In the emergency, therefore, application was made to the Companies, while at the same time the Poplar Borough Council were given the opportunity of submitting an amended tender. Learning that the Borough Council had in contemplation a large increase of their electrical plant, at an estimated cost of £147,000, the County Council considerately gave them until the 11th of March to decide whether or not they would put down such additional machinery as would provide sufficient current for the supply of the tunnel direct from the main generating station. No definite information being forthcoming from the Borough Council by the date mentioned, the County Council, feeling that the matter was too serious to admit of further delay, proceeded to negotiate with the London Electric Supply Corporation. The other Company apparently declined to undertake the job. This action evoked an amended tender at the last moment, from the Borough Council, who, though their great extension scheme had hung in the wind, naturally did not like to lose their trade. The two tenders were considered by the County Council together, with the result that the original agreement with the Borough Council has been rescinded, and the offer of the London Electric Supply Corporation accepted. The prices are 2d. per unit for lighting, and 1½d. per unit for power for working the lifts, &c. These facts contradict the usual statement that municipal electricity in the Metropolitan area is always cheaper than company supplies; and it is an illustration of the irony of Fate that the London County Council should be instrumental in thus demolishing the fabric of error of which this mistake is the foundation.

Speaking of municipal electric lighting, the attention of our readers should be given to a formidable indictment of the finance of this class of business contributedby a "Consulting Engineer" to the "Electrical Review" for the 15th inst. The writer states that he has often had to notice the misleading manner in which local authorities prepare their electricity supply accounts. Not only do the balance-sheets drawn up in this illusory style mislead other corporate bodies who refer to them for information, but they often have the effect of deceiving the corporations who issue them; thus lulling the ratepayers and their representatives into a sense of satisfaction and security wholly unjustified by the actual state of affairs. It is not that the balance-sheet for a particular year is false, so much as the general insufficiency of accounts for one year to indicate the true state of the undertaking. It is observed that the only safe way of judging the prosperity or otherwise of a municipal electricity undertaking is to take the balance-sheets for a period of about ten years, when possible, and see how the property stands when viewed in the proper financial perspective. The first difficulty that arises in the way of a proper analysis of the balance-sheets of a municipal electricity undertaking proceeds from the common neglect to properly subdivide the capital expenditure under the right headings, which renders it almost impossible to estimate the correct amount of depreciation. The writer gives an actual example of a town which has sunk about £100,000 in an undertaking. He has obtained the figures, which happily appear directly as percentages, owing to the round figure of the total. These show that the outlay on buildings was 16 per cent.; generating plant and machinery, 31·5 per cent.; mains, 30·5 per cent.; meters, 4·25 per cent.; electrical instruments, 0·5 per cent.; and public lamps, 10 per cent. The balance—7·75 per cent.—might be put down for land. These are certainly useful data to have by one. On this capital outlay, the average depreciation should be nearly 6 per cent. Land is not included. The rate of depreciation on buildings is put at 1 per cent., which allows for a life of 44 years (at 3½ per cent. compound interest on the amount set aside and invested). Plant and mains are taken at 7½ per cent., or a life of 11 years and 2 months; meters at 10 per cent., or a life of 8 years 9 months. Those with experience of central station work will regard this depreciation as under-estimated; yet on this basis there is scarcely a municipal electric lighting concern in the kingdom which is not living on capital. Several are so far deceiving themselves as to be handing over money for the relief of the rates; whereas in the not distant future they will have to borrow more money to replace the capital now being eaten up. The writer gives a tabular statement of some towns which are nourishing themselves in this fashion; and it is refreshing to note that Manchester, Glasgow, Edinburgh, Salford, Croydon, and Blackburn—all six-figure capitals except the first, which has seven figures—are of the number. The facts are even worse than he states them; because he admits the sinking funds of these capitals as part of the depreciation allowances actually made, which is wrong. Repayment of borrowed capital cannot be accepted as maintenance of the assets in a full condition for continuing to earn money. A business which does not so maintain itself, irrespective of whether the capital is redeemable or irredeemable, is not self-supporting. What fatuity, therefore, is it for municipal undertakings which are perishing at the rate of thousands of pounds a year, to show "profits" and help rate funds!

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see page 534.)

IT was a disappointing week that closed last Saturday on the Stock Exchange. It opened very quiet, and business was quite dull, with a flat tendency all round. And so things went on, despite a recovery in the depressed South African department, until Thursday. Then, lo and behold! there dropt from the skies the reduction in the Bank rate which so many had vainly been praying for so many weeks past, and which now came just when they were not prepared for it. A good thing is only good when you want it. And though there was some little recovery from the worst of the week, the main advantages of this relaxation have yet to come. As it is, prices in all markets show a shrinkage. In the Money Market, rates did not ease much. The 4 per cent. Bank rate (now lowered to 3½ per cent.) had exhibited its tenacity of life since Oct. 2 last. Business in the Gas Market was, as a whole, very quiet, although one or two issues kept abreast of their ordinary rate of activity. It is hard to say why there should be such a degree of listlessness in Gas stocks generally; for there is nothing in the position or prospects of the industry to make them less attractive than they were—indeed, we should say, rather the reverse. But it seems almost a law that markets should be sick now and then. In Gaslight and Coke issues, there was some moderate dealing in the ordinary at close and steady figures, which never wandered outside the limits of 86 to 87½, though the later bargains were not at the highest prices of the week. The secured issues commanded but little attention; and they gave no new indication of movement. South Metropolitan was a contrast, being well up to the average of activity, and attracting good prices that might justify an advance in the quotation; but it was left standing. Commercials marked a bargain or two at moderate figures. The Suburban and Provincial group was almost wholly neglected. Crystal Palace went back a little, but locally Liverpool and Newcastle were rather better. There was not much business in the Continental Companies; but they were in good favour, and both Imperial and Union had an advance. The remoter undertakings gave no sign of movement. The Water Companies have again attracted much attention, and dealings have been very brisk. New River had the chief part in the action, and finished off 40 points better. Southwark was danced up and down daily, and closed none the worse, while others had minor changes.

The daily movements were: On Monday, East London rose 1, and West Middlesex, 2½. On Tuesday, New River gained 10,

and Lambeth 5, but Southwark fell 5. On Wednesday, in Gas, Imperial rose 1½; but Crystal Palace receded 2. In Water, New River moved up 15, and Kent and Southwark 5 each. On Thursday, Continental Union Gas went up 5. In Water, New River rose 10, Southwark 5, and East London 2. On Friday, New River rose 5, and Kent new 2½. On Saturday, Southwark fell 2½, and Grand Junction 1½.

PERSONAL.

The Directors of the Wilmslow and Alderley Edge Gas Company have appointed Mr. WILLIAM SEVERS, jun., the Assistant-Manager, at an increased salary.

Mr. J. G. FISH, the Assistant-Manager at the Falkirk Corporation Gas-Works, has been appointed, out of seventeen applicants, Manager of the West Calder Gas Company.

At the last meeting of the Newport (Mon.) Corporation, Mr. T. CANNING, Assoc.M.Inst.C.E., the Engineer and Manager of the Newport Gas Company, was elected an alderman of the borough by practically the unanimous vote of his colleagues on the Council. He signalized the event by making a donation of £20 to the hospital fund.

The Gas Committee of the Halifax Corporation yesterday week accepted the resignation of Mr. THOMAS HOLGATE, their Engineer and Manager. It is stated that Mr. Holgate relinquishes the duties of the office immediately; and that, pending the appointment of a successor, the works will be under the management of Mr. J. F. SMITH, the Chemical Assistant.

The friends of Mr. SAMUEL GLOVER, of St. Helens, will regret to learn that he has been very much out of condition of late, and his medical adviser has ordered a complete rest and change for two or three months. His Committee have generously recognized the need of this, and have given him three months' leave of absence. Mr. Glover is at Lucerne; and we hope that the change and rest will soon restore him to health and his wonted vigour.

As mentioned elsewhere, Mr. WILLIAM TERREY, the Manager of the Sheffield Corporation Water-Works, has been selected out of 121 applicants for the position of Clerk to the Metropolitan Water Board, at a salary of £1500 per annum. Mr. Terrey is 46 years of age; and he may be said to have been connected with water undertakings all his working life. His first appointment was with the Nottingham Water Company; and when the works passed into the hands of the Corporation, he became Assistant-Manager. He went to Sheffield in 1887, at the time of the transfer of the water undertaking to the Corporation, and eventually was made General Manager of the Water Department. His experience there has admirably fitted him for his new post. He is upon the Council of the British Association of Water-Works Engineers, of which body he was one of the first members.

OBITUARY.

We greatly regret to record the death of Mr. HENRY FREAKES PACKHAM, the Engineer and Manager of the Kingston-upon-Thames Gas Company. At the close of his holiday last September, Mr. Packham contracted a sharp attack of laryngitis, from which however he recovered, and resumed his duties. Soon afterwards he had influenza in a very severe form, accompanied by certain complications. He paid a long visit to Bournemouth, and on his return stayed with his daughter at Surbiton. He had lately made such excellent progress that his family were contemplating his rapid recovery; but early last Thursday morning he passed away quite suddenly. His unexpected death came as a great shock to his family; and it will be deeply regretted by a very large circle of friends. Mr. Packham was the eldest son of the late Mr. Henry Packham, of Thames Ditton, in which village he was born in 1842; and if he had lived until August he would have completed his 61st year. His connection with the Kingston Gas-Works goes back for 42 years, when, as a youth of 19, he entered the service of the late Mr. Charles Aird, who was at that time the Lessee of the works. After 13 years' service under the late Mr. Watson, Mr. Packham was appointed Engineer and Manager; and for the last 29 years the works had been under his control. During that time they were entirely remodelled. When he took over the management, the price of gas was 5s. per 1000 cubic feet, and the make was 114 millions per annum. Now the price is 3s., and the output last year was 465 millions. Within the last ten years the capacity of the works has been exactly doubled; and the output is still rapidly increasing. Besides being a thoroughly capable gas engineer, Mr. Packham was one of the most genial and courteous of men. He never had a dispute with the large staff under his control; while to the general public who sought his advice he was always affable and considerate. He enjoyed, as he deserved, the entire confidence of his Directors, by whom, as well as by all others who were brought into contact with him, his loss will be deeply deplored. During his long illness, his son, Mr. H. W. Packham, had charge of the works. Deceased joined the British Association of Gas Managers in 1874; and he passed into the Gas Institute. He was also a member of the Southern District Association. The funeral was fixed to take place at Kingston Cemetery yesterday afternoon,

TECHNICAL RECORD.

MIDLAND GAS MANAGERS AT RUGBY.

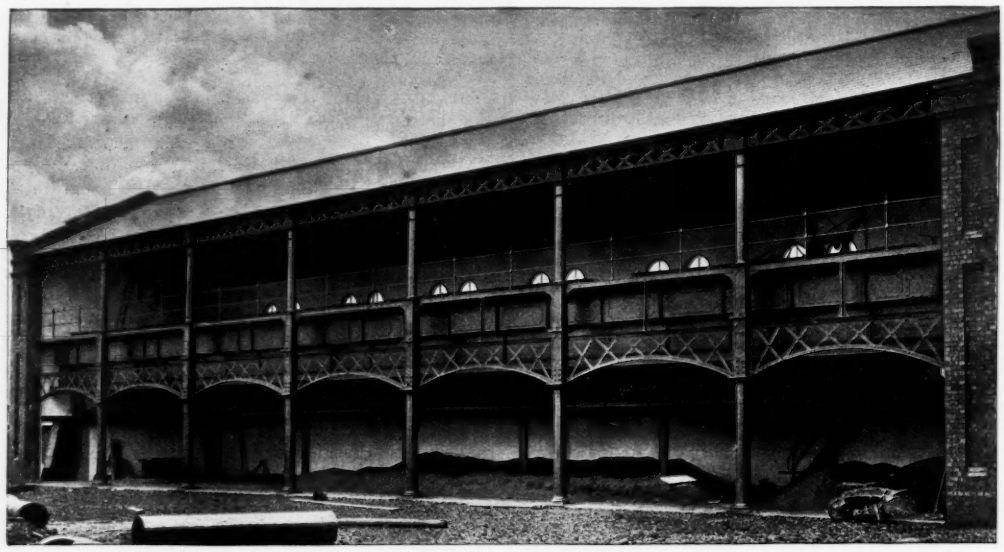
The President of the Midland Association of Gas Managers (Mr. Charles Meiklejohn) is to be heartily congratulated on the unalloyed success of the spring excursion meeting of the members last Thursday. The day was brilliant—in fact, we might have imagined ourselves much nearer than a month or so to the summer solstice—and the pretty surroundings of Rugby, too, with Nature's dress in all its vernal freshness, looked to the occasional visitor, if anything, more charming than ever. Moreover the members met with a bountiful reception on every hand; and the programme of arrangements was composed of pleasure and sight-seeing, which latter brought the visitors in touch not only with the work of their own particular branch of the engineering profession, but with others also. If the number of members of an Association who take advantage of such opportunities as this one to visit their President at home may be taken as a gauge of the popularity of, and the regard entertained for, their official head, then Mr. Meiklejohn must indeed be happy in the affection which his own worth and work has engendered for him in the hearts of his colleagues of the Midlands—for no less than 55 members accepted the invitation to be present, and many others wrote expressing their regret at being unable, for business reasons, to participate in the enjoyment of the day.

The President met his visitors at the railway station about eleven o'clock; trains from Birmingham and farther north conveniently arriving within a few minutes of each other about that hour. A number of brakes transported the party first to the Masonic Hall, in Castle Street, where the Directors of the Rugby Gas Company had already assembled to welcome their and Mr. Meiklejohn's guests. We have referred on a previous occasion to the *camaraderie* and confidence that exist between the Chairman and Directors of the Rugby Gas Company and their Engineer, and which make the gas business in that town move so pleasantly, profitably, and progressively. This agreeable condition of relationship was apparent, before many minutes had expired after meeting in the Masonic Hall, to even those who might previously have been ignorant of it. It was with feelings of sympathy and regret that the members learnt that the Chairman of the Company (Mr. John Parnell) and Mr. Samuel Garratt, also a Director, were unable to be present with them owing to ill-health. The latter gentleman, by the way, is a *doyen* among gas directors. He is above 80 years of age, and has been a Director of the Rugby Gas Company almost since the formation of the Company. However, Mr. A. J. Lawrence, the Deputy-Chairman, worthily filled the place of the Chairman; and he was genially aided in doing the honours of the day by his colleagues—Mr. A. G. Chamberlain, Mr. Thomas Beasley, Mr. George Wadforth, and Mr. Harry Gray.

Personal introductions over, Mr. Lawrence, addressing the members, regretted the absence, and cause of absence, of both the Chairman and Mr. Garratt, and conveyed to the members the expressions of the sorrow of those gentlemen that they were debarred from participation in the events of the day. Then came a hearty welcome from Mr. Lawrence, who brought to mind the fact that eleven years have passed since the members as an Association last visited Rugby. In terms equally cordial, Mr. W. R. Cooper (Banbury) proposed, and Mr. Fletcher Stevenson (Coventry) seconded, a resolution thanking the Directors of the Company for their personal and kindly reception.

The only prosaic business was the confirmation of the minutes of the meeting held in March last at Birmingham. They were read by the Hon. Secretary (Mr. A. Cooke, of Oldbury); and their confirmation, moved by Mr. J. T. Lewis (Wellingborough), and seconded by Mr. T. Berridge (Leamington), was agreed to. Letters of apology from absentees were also read.

A few minutes later the members assembled in the garden in front of the President's residence, where a photographic memento of the occasion was secured. Immediately after, the party again mounted the brakes, and enjoyed a drive along fine roads and through beautiful and picturesque scenery; taking in the old-time villages of Dunchurch and Old Belton. About nine miles of road were traversed; and good appetites were prepared for the luncheon to which the Directors of the Gas Company had kindly invited the members. This was served in the Masonic Hall soon after 1 o'clock. Mr. Lawrence was in the chair; and to his right and left were Mr. Meiklejohn and the Company's Directors already named. The luncheon was an excellent one. Before leaving the table, the loyalty of all present was once more asserted; and then there were two complimentary toasts. The first was proposed by Mr. Lawrence; and it was "Continued Success to the Midland Association of Gas Managers." Again the Chairman cordially welcomed the members; and he made a hit, which provoked general laughter, when he gravely acknowledged that "I am not one of Sir George Livesey's expert directors, for whom, I happen to know, your President has supreme contempt." He expressed the sincere respect which the Directors possessed for the Association; and this reminded him that it was eleven years since Mr. Meiklejohn stood in the Board-room before the Directors as a candidate



General View of the New Purifying-House at Rugby.

(The Elevator and Engine-House are situated through the Door-Way shown in the End Wall at the Left-Hand Side of the Picture.)

for the post of Engineer and Manager of the Company, which had been vacated by an old and respected member of the Association —Mr. Peter Simpson, whose loss all so sincerely regretted. On that occasion, the Chairman, referring to Mr. Meiklejohn, said to him (Mr. Lawrence): "This cannot be a bad sort of man to get on with, or the Midland Association would not have elected him Hon. Secretary." (Laughter.) This was one of the considerations that led to his friend's appointment; and the words had proved quite true. He was not "a bad sort of man to get on with." In the course of his reply, the President said he had been thinking that, if the Association were responsible for him going to Rugby, the responsibility might have been a somewhat fearful one; but, after eleven years' pleasant work so far as he was personally concerned, it was his gratification and pride to find that the Directors could still receive the members with smiling faces. As to expert Directors, he was happy to confess that, so far as his Rugby experience went, he had no desire to change his Directors for any of them. Apart from their own little Company, the members of the Board all took an intelligent interest in general matters affecting the gas industry. He was quite sure, from his own experience, that the comfort of all would be materially advanced if directors of other companies and committees of local authorities throughout the country had the same sense of responsibility for the welfare of their engineers as his own Directors had. It was extremely regretful to him that his Chairman was laid aside, as he had always been very interested in the work of the Association; and it would have given him great delight to have welcomed the members in person. The President's concluding sentences were composed of words of hearty thanks to the Directors for the warmth of their welcome and hospitality. Mr. R. O. Paterson (Cheltenham) was the chosen mouthpiece of the members in proposing "Prosperity to the Rugby Gas Company;" and, the toast being enthusiastically honoured, Mr. Chamberlain made a neatly framed and humorous response.

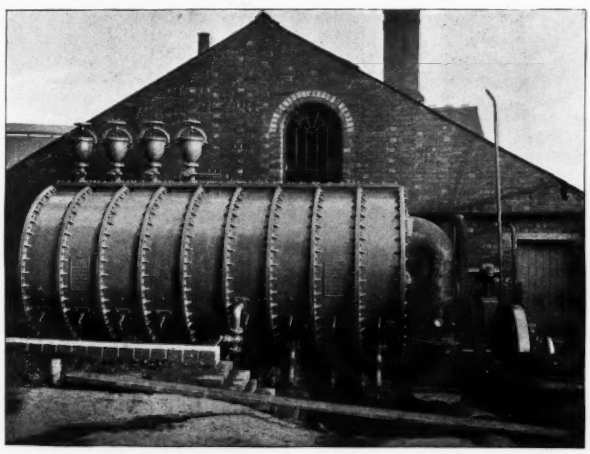
A Visit to Messrs. Willans and Robinson's Works.

Rugby bids fair to become a large centre of industry, and to gain for its productions a reputation which some day may rival,

Interior of the New Purifying-House at Rugby.

(Oxide Belt Conveyor shown Overhead.)

though it will never dislodge from its eminence, the historical scholastic reputation of the town. That can never be, however great its future industrial attainment. It was to the great engine-producing works of Messrs. Willans and Robinson that the members betook themselves after luncheon; and there they were very kindly received, and saw much, and heard much, that was highly interesting and instructive. The favour in which the Willans engine has grown necessitated considerable extensions of the works in 1897; and now the buildings cover between 5 and 6 acres of land, with liberal provision for future extension. Between 1100 and 1200 men are engaged on the works (which, by the way, are not the only ones possessed by the Company), in addition to officers, and something like 100 men on outdoor work. We cannot attempt to picture all that was seen in the vast shops; but everywhere machinery and men were fully and busily employed on small and large work, on the casting and finishing of parts, and on the fitting together and testing of the complete engines, which range from low powers up to 3000-horse power. The engines at present in course of construction are chiefly for use in electrical work—not so much electric lighting as for generating power for electric traction; and this gave members an insight into the rise in magnitude in the past few years of this class of work. The foundry was first visited; and here it was gathered that the present average quantity of metal dealt with in a week is 120 tons—though sometimes as much as 50 tons is dealt with in a day. The castings vary in weight up to 30 tons; the bed-plates and fly-wheels for the engines being the heaviest classes. One half of a bed-plate was seen (though still in the rough, with an excellent surface) weighing some 25 tons; and a fly-wheel of equal weight was also an object of interest. The machine-shops invited much attention—the plant and tools, of course, being all of modern type, for the production of high-class work. The greater part of the machinery is driven by electric power. The work of every man in these shops



New Washer-Scrubber, showing the Cyanide-Recovery Arrangements.

is subject to inspection and rigid measurement; and nothing is passed that does not conform strictly to requirements. The various stores and pattern shops were visited, and also a new power station which is being fitted for the electricity supply of the works, and for the accommodation of the compressed-air plant for the pneumatic tools. In the power station, it was remarked that Messrs. Bruce Peebles and Co.'s dynamos have been adopted, and are highly regarded by the firm. All the engines, large and small, are erected, and strict running tests and records made, under the supervision of the engineers, before leaving the works. To Mr. Eaton Shore (the Works Manager) and his Assistants (Messrs. Colquhoun, Reynolds, Sandberg, Sell, Coleman, and Lovatt) the heartiest thanks must be tendered for their courteous attention to the members and the liberal information imparted in every department. But the indebtedness of the visitors did not end with the inspection of the several huge shops, for before quitting the works, they were entertained to tea; and then, in the dining hall, they had the pleasure of meeting Captain Sankey, R.E., one of the Directors, who made apologies for the absence of Mr. Robinson, who had been unavoidably detained in London. Complimentary speeches were made by the President and Mr. George Helps in thanking their hosts and the staff for the afternoon's enjoyment so courteously and liberally given. Captain Sankey made an interesting reply, in the course of which information was imparted as to the practice of profit-sharing by the Company in order to give the employees a direct interest in their work, and mention was also made of a producer-gas engine (we believe of 350-horse power) which the firm are now making. The members left the works full of appreciation of the privilege extended to them by Messrs. Willans and Robinson on this visit to Rugby.

The Extensions at the Gas-Works.

Only a few yards removed from Messrs. Willans and Robinson's works are the works over which Mr. Meiklejohn presides, and where he has lately been, and is now making, some considerable extensions. These were inspected; and in the fine new purifying house especially, the President was for some time kept busily occupied in giving explanation in answer to inquiries. The new works comprise the purifying house, boxes, and oxide-elevating plant, a new Holmes washer-scrubber (fitted for testing the cyanide process as described in the President's address in March last), and an extension of the retort-house. The completed extensions are illustrated in the photographs.

The new purifying-house is a substantially-built structure of brick and stone, open on the yard side; the transverse floor girders and the roof being supported by cast-iron columns connected by lattice girders, as shown in the photo of the front elevation. The purifiers are fixed on a girder floor, consisting of six longitudinal joists (one under each joint of the bottom plates) 10 in. by 5 in. by 5 in. by 30 lbs. per foot, supported at each end on the wall of house, and intermediately by the transverse girders. The transverse girders, six in number, are 16 in. by 6 in. by 6 in. by 62 lbs. per foot, and are supported at one end in the side wall of the house, and at the other end and centrally on cast-iron columns, which also support the roof. The roof is of steel, having fourteen principals 30 ft. 6 in. span, each principal consisting of two rafters and tie-beam of 3 in. by 3 in. by $\frac{3}{8}$-in. T steel, central ties of 3 in. by $\frac{3}{8}$ in., and struts $2\frac{1}{2}$ in. by $\frac{3}{8}$ in. flat; the various members being connected together with $\frac{3}{8}$-inch apex and junction plates. The shoe-plates are all $\frac{3}{8}$-inch thick, angular in form, strongly riveted to the rafters, and bolted on one side to the lattice girders, and on the other side to the wall of the house by means of Lewis bolts fixed in stone-pads.

The purifiers are four in number, arranged in one line, and connected up on Milbourne's patented principle. Each purifier is 25 feet square by 5 feet deep, and consists of bottom plates 5 feet square, with side, end, and division plates 5 feet wide. The return box is cast solidly on eighteen of the side plates. Along the longitudinal centre of the tops of the four purifiers, the top plates are fixed 5 feet wide, and across the transverse centre, top plates 2 ft. 6 in. wide are fixed. The remainder of the top space in each purifier is covered by two steel lids. The top plates are supported by standards from the bottom of each box and by the division plates. Every plate forming the purifiers has been truly planed and surfaced. The purifier plates and standards are prepared to receive four tiers of sieves and bearers.

Each purifier is provided with an 18-inch inlet and outlet column, surrounded by a square box; the gas-passage being controlled by a disc, worked by means of a spindle, through a gibbet fixed on the top plate. The 18-inch connections joining up to these inlets and outlets consist of two straight lines of pipe; and the purifiers can be worked: All four on in rotation, any purifier first; three on and one off, any purifier first; two on and two off, any purifier first; or one on and three off. The course of the gas from No. 4 to No. 1 purifier is through the rectangular box, 2 ft. $2\frac{1}{2}$ in. by 10 in., cast solid with the side plates.

In each purifier are fixed two sets of discharging trays and openings for lowering the oxide on to the floor below. At these positions, and fixed to the underside of the bottom plates are cast-iron shoots, 18 inches diameter, fitted with self-sealing lids, cross-bars, and fastenings complete, and each fitted with a separate chain and padlock to prevent unauthorized use.

The covers are held in position by means of holding-down bolts $\frac{7}{8}$ inch diameter, with forged eye at the lower end. The joint between the purifier top plate and the underside of the curb of the cover is secured by a rubber pad, firmly cemented to the cover curb, and carried away therewith when the latter is removed.

The apparatus for lifting, travelling, and lowering the covers consists of a double jibbed crab, fitted with winch-handles, spur gearing, and barrel and chains complete. The crab runs on a pair of steel flanged rails, securely bolted along the whole length of the longitudinal balcony of the purifiers.

At one end of the purifier-house is fixed an oxide elevator, 33 feet centres, constructed with single strand No. 101 detachable chain, with stamped steel buckets and wrought cross-bars, steel elevator framing, fitted internally with angle-iron guides, and renewable wearing strips. The elevator boot, with cast-iron sides and wrought-iron bottom, is fitted with a tension arrangement, consisting of gun-metal bearings, wrought-iron tension screws, and gun-metal nuts. A countershaft is fitted about midway, in casing with angular pedestals, fast-and-loose pulley, and striking gear. The elevator, having to be placed outside the building, owing to the limitation of the space, is protected from the weather by corrugated iron sheeting, supported on a framework of angle-irons.

One band conveyor, about 107 feet centres, of three-ply rubber and canvas belt, 16 inches wide, is connected to the end walls by strong cast-iron fixings, with tension arrangement for tightening the belt, and pulleys and shafts, gun-metal bearings, intermediate carriage rollers of steel 5 inches diameter and 18 inches wide, with self-oiling bearings, longitudinal channel conveyor rails, with brackets and stays, which are attached to the T steel tie-beams of the roof principals. Steel curving rollers are fixed, to give the necessary curvature to the belt. A throw-off carriage travels the

entire length of the conveyor, and is fitted with canvas shoots for delivering the oxide to the purifiers below. The conveyor is driven from the elevator head by means of detachable chain and wheels. For working the elevator and conveyor, a Crossley's gas-engine of seven effective horse power is provided, with leather belting for the drive from the engine to the countershaft and from the countershaft to the elevator.

The Contractors for the whole of the ironwork were Messrs. C. & W. Walker, whose contract included the elevator and conveyor supplied by Messrs. S. S. Stott and Co., of Haslingden.

The "New" scrubber-washer was supplied and erected by Messrs. W. C. Holmes and Co., of Huddersfield, and is of 1,000,000 cubic feet per day capacity for ammonia extraction. As this is in excess of present requirements, the opportunity has been taken to sub-divide the machine; and the first half will be used for the cyanogen process, and the other for ammonia.

The present extension of the retort-house consists of provision for an addition of three beds of eight retorts, or 48 mouthpieces. The retorts will be horizontal, 22 in. by 16 in. in section, 20 ft. long, and stopped in the middle. The furnaces and settings will be of the Klönne regenerator principle, as modified and improved by Mr. R. O. Paterson, of Cheltenham. The addition to the retort-house takes the place of an old coke-shed, and is 40 feet long and 65 feet wide. It is intended, when the new section is at work, and the necessity arises for adding to the carbonizing capacity of the house, to continue the walls outside of the present retort-house (which is only 50 feet wide) and carry the system throughout with coal-elevators, conveyors, and whatever method of charging by machinery may, at the time, give promise of the best results.

Shortly after the inspection, the members had to leave in order to catch their trains for home; and their parting expressions of delight with the day they had spent were many. Their delight was the President's gratification.

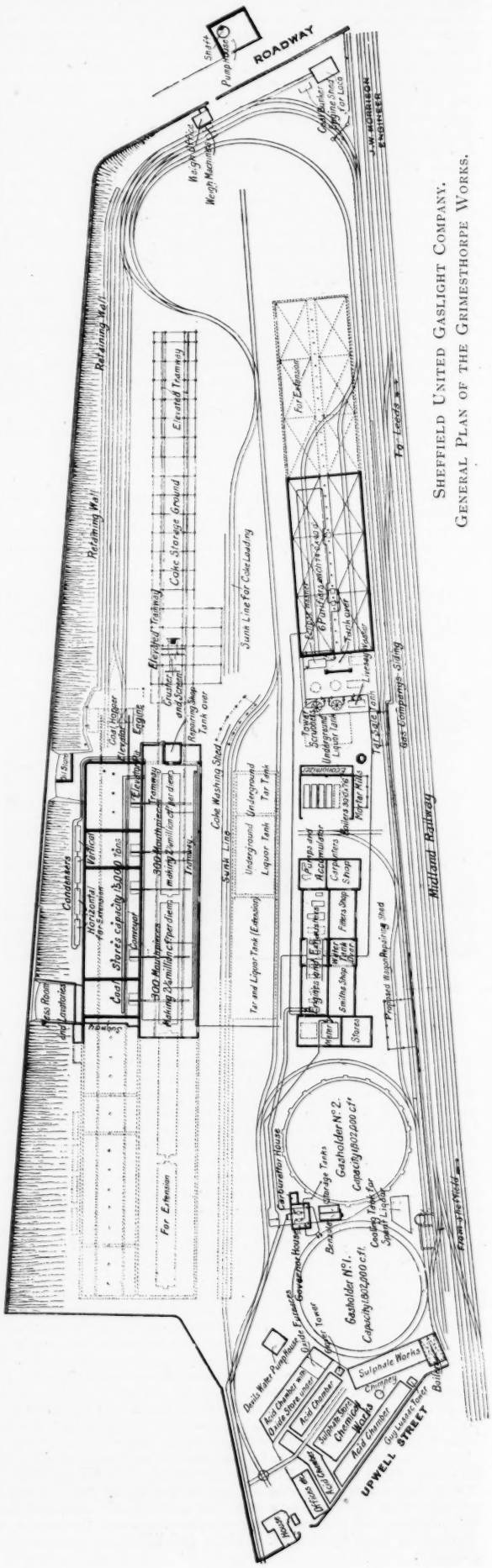
MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

A Visit to, and Hearty Reception at, Sheffield.

From all quarters of their extensive district members of the above Institution travelled early last Saturday; their objective being the great industrial centre of Sheffield, to which town they had received a most cordial invitation from the Chairman (Sir Frederick T. Mappin, Bart., M.P.) and the Directors of the Gas Company. Leaving Manchester and Bradford respectively at the same time—9.50 a.m.—the members, with their President (Mr. S. R. Ogden, of Blackburn) and Hon. Secretary (Mr. H. Kendrick), arrived at the Victoria Station, Sheffield, about 11.15, where coaches met them, and at once conveyed them to the Grimesthorpe Gas-Works of the Company, which is at present the second in productive capacity of the three stations, though time may see it transplanting Neepsend from the premier place.

It may be of interest to put on record here a few facts about the history and growth of the Company, before proceeding to give some notes regarding the Grimesthorpe works. The Company was formed by the amalgamation, in 1844, of the two Companies then supplying the district with gas. The consumption in the following year was 62,455,000 cubic feet, the leakage 31 per cent., and the price 6s. 8d. per 1000 cubic feet. Now comparing the gas supply of Sheffield to-day with what it was in those early years, we have a remarkable illustration of the abnormal development of this truly progressive concern—progressive on all sides, in its management, in the adoption of modern methods of manufacture, in business, and in the utmost consideration for the consumers. Last year, the gas consumption was no less than 2,751,866,000 cubic feet, the unaccounted-for gas 4·42 per cent., and the price is now from 1s. 10d. to 1s. 6d. per 1000 cubic feet, according to the quantity consumed. The maximum day's consumption in the year was 16,158,000 cubic feet. Place these figures alongside those that obtained in the middle years of the forties; and the differences between then and now supply a condition of affairs upon which the Company may justly pride themselves—particularly in respect of the price they charge for gas, which is of the very foremost rank of gas prices to-day. The area of the Company, of course, is a substantial one. It comprises some 135 square miles, over which are carried 504 miles of mains, connected with which are some 69,000 consumers. The Company have three stations: Neepsend, with a manufacturing capacity of 8½ millions; Grimesthorpe, with 4½ millions; and Effingham Street, with 3½ millions—making a total of 16½ millions a day, which, taking the Company's maximum day's consumption last year, does not give them a very large margin ahead of it. However, the Grimesthorpe station is to be extended, as necessity demands, to double its present capacity, or 9 million cubic feet. At the three works, it may be added, a total of 280,000 tons of coal is carbonized annually.

It was to the Grimesthorpe station—the newest of the three—that the members of the Institution, of whom there were about 70 present, were first of all conveyed on reaching Sheffield. The



SHEFFIELD UNITED GASLIGHT COMPANY.
GENERAL PLAN OF THE GRIMESTHORPE WORKS.

General Manager of the Company (Mr. Hanbury Thomas), the Engineer (Mr. J. W. Morrison), himself a member of the Institution, and the Station Superintendent (Mr. J. Wilkinson), who is also a member, were courteous in the extreme—everything that was possible on their part being done to make the visit one of interest to their visitors. The works cover an area of 16½ acres; and Mr. Morrison has kindly supplied a plan showing the disposition of the plant over that area. This plan, with the accompanying notes (taken from a handy little leaflet which Mr. Morrison had prepared for the information of the members) will give readers a good indication of the character of the works.

Notes on the Grimesthorpe Gas-Works.

The coal is received in trucks from the Midland Railway sidings, adjoining the works, and is unloaded by an hydraulic waggon-tipping plant into an elevator. It is then conveyed on an endless belt, 720 ft. long, by 2 ft. 6 in. wide, and deposited in the coal-store, which runs the whole length of the retort-house, and has a capacity of 15,000 tons. From the coal-store, five coal-breakers and elevators place the coal at equi-distant points along the retort-house in hoppers for the supply of the stoking machinery.

The retort-house is 346 ft. long, by 70 ft. wide, and contains thirty settings of ten retorts, 20 ft. long, by 22 in. by 16 in., all heated by regenerative furnaces. The retorts are charged every six hours, with 7¼ cwt. of coal, and worked with one set of West's compressed-air stoking machinery. When the house is on full work, 800 mouthpieces are charged per shift. The hot coke is drawn from the retorts into the furnaces for firing; and the remainder into cages fixed under the stage-floor of the retort-house, where it is quenched and then delivered into waggons, which are hauled up an inclined tramway on to the coke storage ground by a 14-horse power gas-engine. There it is screened, sorted, and loaded into carts or railway trucks in an adjoining sunk siding.

When the gas leaves the hydraulic main, it is conveyed in 30-inch and 36-inch diameter foul mains, fixed on all four of the inner walls of the retort-house. Then along the full length of the coal-store, returning to the retort-house and on (if necessary) to the condensers. These are three in number. Nos. 1 and 2 each consists of 1280 feet run of 18 inches diameter cast-iron pipes (33 ft. 6 in. high, placed vertically) through which the gas passes in three streams. Then on to No. 3, which is of the horizontal type, consisting of six tiers of twelve rows of 9-inch pipes, each row being 72 feet long. The bottom four tiers are immersed in a cast-iron tank containing cold spring water. With a view of preventing the formation of naphthalene, the gas during the last eighteen months at this works has not been condensed below a temperature ranging from 70° to 85° Fahr.; and the Company are very well satisfied with the great improvement made in the reduction of the complaints from stoppages in the district. For several months past, all the condensation required has been done in the foul mains; the condensers being bye-passed.

The gas is then taken through a 30-inch main to two Gwynne exhausters, which are direct driven by vertical engines, and are each capable of passing 125,000 cubic feet per hour. The building in which these are housed contains the air-compressing machinery, hydraulic engine, and a 16-horse power gas-engine for driving the workshop machinery. Foundations have also been provided for duplicating all the above apparatus, and for a fan for driving gas from this works to either of the other works, or district governor stations.

In the adjoining building is found the tar and liquor pumps, and hydraulic accumulator loaded to give a pressure of 700 lbs. per square inch, from which the power is drawn for hauling and tipping the coal-trucks and working the lime and oxide hoist.

The boiler equipment consists of four "Lancashire" boilers, each 30 ft. long by 7 ft. 6 in. diameter, fitted with "Meldrum's" forced blast, with the necessary boiler-feed pumps, water-heater, and also a Green economizer. The purification plant comprises: A "Livesey" washer of 5 million cubic feet capacity, with two tower scrubbers, 45 ft. high by 12 ft. diameter, filled with boards, through which liquor is continually being pumped, and one Clapham rotary washer of 5 million feet capacity. (Two additional tower scrubbers are in existence; and these will be brought into use when required.) The purifying-house is 224 ft. long by 91 ft. wide, and is arranged with ground, first, and second floors. It contains six purifiers, each 74 ft. by 40 ft., having twelve covers per box (Green's type), with discharging openings in their bottoms. Four purifiers are worked as ordinary boxes, and charged with two layers of oxide and one layer of lime per box; the other two being charged with oxide only, and are used merely as catch purifiers. The ground floor is utilized for revivifying the oxide, and the second floor for storing the revivified material and new lime. An hydraulic hoist is provided for elevating the purifying material to the different floors. All the mains in connection with the purifiers are slung from the flooring, and are exposed.

As to other plant, the station meter was made by Messrs. Parkinson and Co., and is of 250,000 cubic feet per hour capacity. There are two four-lift holders on the works, each having a capacity of 1,800,000 cubic feet. These are 151 ft. 6 in. diameter, by 111 ft. 6 in. high; the top lift of each extending beyond the framework. Two Cowan governors regulate the pressure for the district. A Maxim-Clark carburettor is used for enriching the gas to the required standard. Tar and liquor storage wells and tanks, having a capacity of 1,033,000 gallons, also water-tanks holding 132,000 gallons are provided. For executing the necessary repairs, a well-arranged set of workshops are available, consisting of carpenters', fitters', and blacksmiths' shops, with circular saws, morticing machines, lathes, shaping, drilling, punching and shearing machines, steam-hammer, &c., also the necessary buildings in which the general stores are kept. The water for ordinary purposes is pumped by an 8-horse power gas-engine, from an old colliery working at the extreme end of the works. For working the traffic in and out of the works, a 12-inch locomotive is used; and there are over 2 miles of sidings on the works.

Adjoining the gas-works are the chemical works, where the Company work up the whole of the liquor they produce, and where they also make about 3000 tons of sulphuric acid annually. The sulphate plant is capable of producing 140 tons per week, and consists of a Colson and a Walker free and fixed stills. Room is provided for the storage of 600 tons of sulphate of ammonia.

The Hospitality of the Sheffield Company.

By coach, the members were conveyed from the Grimesthorpe works to the Royal Victoria Hotel, where, on the invitation of the Sheffield United Gaslight Company, the visitors were entertained at luncheon. Mr. Morrison presided, and at the close of an excellent repast gave the toast of "The King and Royal Family," and subsequently "The Institution." Mr. Ogden responded. The only other toast was "Prosperity to the Sheffield Gas Company," proposed by the Senior Vice-President, Mr. H. Townsend, of Wakefield.

The Excursion to Baslow.

Somewhat after schedule time, the drive to Baslow was commenced; and glorious summer weather prevailing, a most enjoyable excursion was the result. A substantial tea at the "Peacock Inn," served in a marquee in the grounds, was done full justice to before the return journey was commenced.

The "Business" Meeting.

Only formal business was transacted—as usual at the summer outing. During the tea, the President suggested that the minutes of the last meeting should be taken as read; and this was agreed to. It was also unanimously resolved that letters of regret for inability to be present, through illness, should be addressed to two of the absent members—Mr. Thomas Newbigging and Mr. Harrison Veevers. The assistance rendered by the Sheffield Gas Company towards making the day's proceedings so successful, as also the efforts put forward by Mr. Morrison and Mr. Wilkinson, having been duly acknowledged, on the proposition of Mr. S. Meunier, of Stockport, seconded by Mr. W. W. Hutchinson, of Barnsley, the proceedings ended.

OHIO GASLIGHT ASSOCIATION.

(*Continued from p. 371.*)

The Question Box.

Mr. Henry L. Doherty, the Editor of the Question Box Department, presented a printed report comprising over 150 pages, containing 160 questions, and answers to many of them, contributed by 73 members. Copies of the report were distributed with a view of taking a discussion at a later period of the meeting. In inviting suggestions as to items to be selected for discussion, the Editor drew attention to the aims and objects of this department, as set forth in the introduction to the report. The value of the Association must be measured by the service rendered; and while the Council did their best to find out the needs of the members, the Question Box afforded a means of directly stating such needs. He also pointed out that the existence of the Association depended on a free interchange of knowledge among the members, and confessed to some feeling of disappointment as to the want of completeness in the answers. The number of questions had exceeded his expectation; but he had as yet been unable to secure the co-operation of some members who were in a position to give valuable aid. This might be due to shortness of time and a want of clear understanding as to his objects; and he believed that another year there would be a better response. Numerous questions of primary importance were as yet undecided or imperfectly understood; and the Question Box was a valuable medium for investigation and research, with a view of arriving at the best results. He referred to matters such as the method of mapping mains, and showing all necessary details; the various sizes of coke prepared for the market; the method of scurfing retorts; and the paint preferred for gasholders. In respect to these, it was possible to arrive at some standard rules. It might also be a means of keeping before the members the various purposes, technical and otherwise, for which gas could be used.

Are Eight-Hour Shifts Desirable?

This was the first question discussed. Two answers printed in the report both favoured the affirmative. Mr. M'Ilhenny could not say that it was as economical as the longer shift, but had found it a desirable thing to adopt. Mr. Clausen said that at Portsmouth he got on as well with the eight as with the twelve hour system, if not better. Mr. Miller said there was no question as to being able to get good results with an eight-hour shift; but whether it

was economical was another thing. It would not be practicable to get eight hours at two-thirds the wage paid for twelve hours, and he preferred the twelve-hour shift. The Editor said the tendency was towards shorter time or increased rates, and advocated paying strictly on an hour basis. Shortening the hours from twelve to eight on the same rate of daily pay meant increasing the wages 50 per cent.; and hourly rates made this evident.

Storage of Coal.

The next question taken dealt with the above subject. Was it preferable to keep a reserve untouched except in emergency and to use fresh coal as a regular thing, or should it be the rule to use the oldest coal, or to clear out the stores once a year? Several printed answers appeared to this in the report, mostly in favour of not keeping coal in store too long, and having the stores so arranged as to admit of constantly using up the oldest coal. Some, however, appeared to think that depreciation or ageing was a diminishing quantity, becoming less the second year than the first, and so on, and therefore that a stock for emergencies might be kept an indefinite time if found desirable. The Editor pointed out that the rate of depreciation varied according to the quality of the coal; and the safe rule was to store that which depreciated least. Mr. Osborne remarked that one gentleman gave the depreciation as 18 per cent. per annum, at which rate the coal would be worth *nil* in a few years. He knew of coal stored for several years and then found fairly good, but, of course, not so good as when fresh. Mr. Miller had lately used Youghiougheny coal that had been stored for twenty years, and it was as good as fresh coal. Something turned upon whether the coal was stored under cover or in the open; and in connection with this question, it was necessary to consider the means of supply. At times during the summer he could not get coal for four or six months. He stacked it to a height of 40 feet, and found that though the top 2 or 3 feet might go back 5 per cent. in two years, the bulk was not affected. This referred to coal stored in the open. Mr. Stone said that experience at Buffalo exactly coincided.

Purification Questions.

Are Purifier-Houses Necessary? In reply to this question, it was agreed that they were in extreme climates, to protect the labourers, and also to keep up a proper temperature; purification being a chemical process that require a uniform and not too low degree of heat. At Madison (Wis.), a Doherty-Butterworth purifying-box was situated out of doors, but was lagged with match boarding and building paper, and protected by a corrugated iron roof. A steam coil had been provided, but was not found necessary during the past winter, as the temperature at the outlet never fell below 50°. In the case of some ordinary purifiers situated in buildings, steam heat was necessary, because, for obvious reasons, the buildings must be freely ventilated. The cost of the box was far less than that of the ordinary design with cheap buildings. A covered shed was required for revivifying oxide; but this could be of the cheapest possible construction. An oral discussion being taken, Mr. Thwing thought that the size of the boxes, as effecting the frequency of changes and area exposed to radiation, had something to do with the question. Mr. Hayward frequently heard of complaints that oxide would not act at a temperature below 40°, and had known such difficulties to be entirely remedied by laying a steam coil or taking other means to prevent the temperature in the purifying-house falling below 50°. Mr. Lea remarked that in climates not exposed to very severe frost, it was sufficient to set the box in the ground, so that the ground level served as a filling floor, and to erect a light wooden shed as a protection during changing. This practice was common in England. Mr. Steenbergen had a concrete purifier-box out of doors and unprotected; but it gave no trouble whatever. Mr. Doherty argued that houses could be dispensed with, as was proved at Madison, where the temperature occasionally went down to 35° below zero. Buildings were costly, and also inefficient. The line he followed was to reduce the radiating surface or area to such an extent that the heat generated by the chemical action in the boxes was more than enough to compensate for the loss by radiation. He agreed that if the temperature inside the purifier fell below 40°, trouble might be expected; but housing the purifiers did not prevent this from taking place. He knew of houses where all the waste steam on the works would not keep up a proper temperature. The only advantage of a building was when emptying or refilling. The Doherty-Butterworth purifier only required changing once a year, and could therefore be dealt with in the summer. But as he used a mechanical conveyor or air blast, it was such a short job that protection from the weather was scarcely a necessity at any time. The box was 13 ft. 6 in. deep, and was set 6 ft. 6 in. above ground. The oxide was in vertical layers, not horizontal. Chollar's purifier could also be used out of doors, if lagged.

Another question was whether, with coal-gas purifiers run without air, three boxes were not preferable to two deep ones. The printed answers were in favour of not less than three boxes, with one exception, where two large boxes, of such a size that one would do all the work, were preferred. In reply to an inquiry as to how the present cost of purification compared with that of ten years ago, there was a general agreement that, with a better knowledge of the effect of velocity, the need for efficient scrubbing or washing, and other details, the cost had been reduced to a mere nominal figure. The Editor thought that working costs had already been reduced so low that the only question was how to reduce the first cost of plant.

In reply to a question as to the possibility of purifying gas made from coal containing 6 per cent. of sulphur, Mr. Bredel stated his experience in handling native Illinois coal, which contained 5 per cent., or more. He had three washers, each having five compartments, which practically meant fifteen washing boxes. The gas was passed through an air condenser, and entered the first vessel at 100°. It was passed on immediately to the second, and through a water cooler before entering the third. The nominal capacity of the apparatus was 250,000 cubic feet; but it would only deal satisfactorily with 185,000 feet. It was worked in the usual way—strong liquor first, then weaker, and lastly clean water. The first vessel took out a lot of sulphur and ammonia, the second carbonic acid, and the third finished the ammonia. Mr. Doherty understood that ammonia had a stronger affinity for carbonic acid than for sulphur at ordinary temperatures, and thought that the gas in the first washer might be at a temperature of 140° to 150°—high enough to decompose the carbonate of ammonia. Mr. Bredel thought it was not substantially above 100°; but he had observed that the gas was 5° or so hotter at the outlet than at the inlet of the first washer. Most of the bisulphide of carbon was also washed out, as the gas, after passing the washers and oxide purifiers, contained only 22 or 23 grains of sulphur per 100 cubic feet. He did not think the oxide reduced the bisulphide.

In answering a request for arguments in favour of or against the use of air purification, the printed replies were all in favour of a moderate use—say, 1½ to 2 per cent. of air. Mr. Doherty thought most of the difficulties arose from want of proper regulation in admission. The best arrangement he knew of was a small forge blower fitted to the exhauster. Mr. Stone had seen a kind of differential arrangement fitted to the station meter, comprising an old-fashioned water-seal meter and changeable gearing, so that any desired proportion of air could be admitted at the inlet of the purifiers. The advantage of this device was that it did not depend to any extent on the judgment of the men in charge, but could be set or regulated by the superintendent. Mr. Harrop admitted that air was generally used, and with advantage, but pointed out that it contained four-fifths of useless inert nitrogen. It should therefore be very carefully regulated and admitted in constant proportion, by mechanical means, and not left to a man in charge, who might work irregularly—letting in too little one hour, and too much the next to make up lost ground. He was just adopting a cyanide recovery process, in which the admixture of air or the presence of oxygen in any form whatever would be an objection.

Meter Sizes.—Mapping of Mains.—Coke.

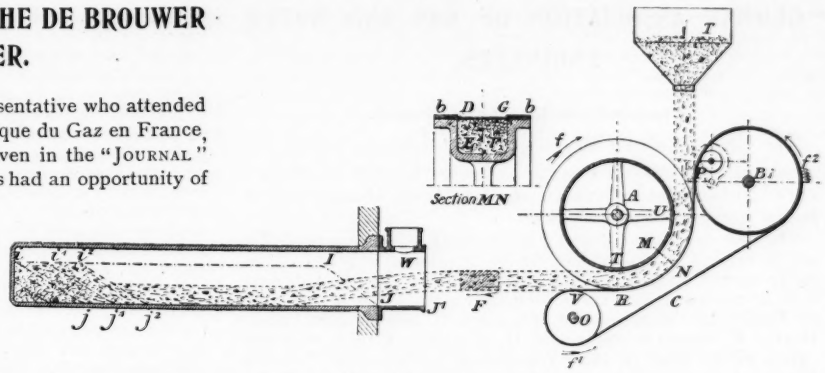
Mr. Doherty directed attention to one of the printed answers dealing with the various sizes of meters, which showed the present system was purely arbitrary, and in fact amounted to nothing. One manufacturer had no difference in size between a 20 and a 30-light meter. Most of those present believed that a 10-light was more than three times the size of a 3-light; but, as a matter of fact, it was not double the size. The rating at so many lights of 6 cubic feet each never did mean anything, and was obsolete. It was desirable to have meters of known dimensions, and especially of uniform measure from centre to centre of connections. There was a general tendency towards the use of iron connections; and a uniform distance would obviate the need for offset joints. He moved the appointment of a Committee to take up the subject of a new and rational rating of meters, of uniform dimensions, and prices proportionate to the cost of manufacture. After some discussion, the resolution was unanimously adopted. On the suggestion of the same gentleman, a Committee of one was appointed to work out a uniform system of mapping mains and to report at the next meeting. He also moved that Mr. C. W. Andrews, who was almost exclusively engaged in the coke business, be appointed a Committee of one to devise the most suitable sizes of coke to be put on the market, and a uniform nomenclature for the same, and to report, through the medium of the Gas Journals, in six months time; and this was agreed to.

(*To be continued.*)

"Water Companies' Accounts" is the title of Vol. XIX. of the Accountants' Library, a copy of which we have received from the publishers, Messrs. Gee and Co., of Moorgate Street, E.C. It is a useful little book by Mr. Frank Key, A.S.A.A., who gives, in concise language, directions for keeping the accounts of a water company. They are exemplified in an appendix by a complete set of accounts in the name of a fictitious company. In another appendix are given extracts from the Companies' Clauses Consolidation Act, 1845, the Water-Works Clauses Act, 1847, and the Metropolis Water Act, 1902. There is a full index; and forms are given to show the methods of ruling the various books. The author appears to have carried out the ideas of the projectors of the Library—viz., to give just as much attention to technical points as is necessary for the elucidation of the system of accounts advocated, without aiming at presenting an exhaustive treatise on the manner in which each separate business is conducted.

TYPICAL INSTALLATIONS OF THE DE BROUWER RETORT-CHARGER.

In the account furnished by our representative who attended the recent meeting of the Société Technique du Gaz en France, of the proceedings on that occasion, as given in the "JOURNAL" last week, he mentioned that the members had an opportunity of seeing in operation the De Brouwer retort-charger, an illustrated description of which, prepared after a personal inspection of the machine at the Bruges Gas-Works, appeared in our issue for the 24th of March (p. 748). This, it may be remembered, was supplemented by the appreciative notice of the charger by Heer Bolsius, which was translated from "Het Gas" in the number for the 12th inst. (*ante*, p. 367). The capabilities of this ingenious invention were brought before the members of the Association of Belgian Gas Managers at one of their most recent gatherings, when one of them had the boldness to declare, amid the applause of his colleagues, that it would ere long furnish the exception to the general rule that "a prophet is not without honour save in his own country," by being installed in all the gas-works in the kingdom. The Committee of the Société Technique were evidently desirous that French gas engineers should have an opportunity of judging how far the eulogy the machine had received in the land of its birth was justified, and by the combined courtesy of the Toulon Gas Company and their sympathetic Manager, M. Bachelay, their wish was gratified. Moreover, the members of the Society had the machine fully explained to them, by the aid of a model, in the paper read by M. Laurain, to which reference was made last week.



In his introductory remarks, M. Laurain pointed out that up till recently the solution of the problem of mechanical or semi-mechanical retort-charging had been sought in the employment of the appliances generally in use with hand stoking, but so arranged as to be filled with coal and inserted in the retorts without muscular effort. This is the principle embodied in the various machines now in use, one of the latest of which—that of M. Sarrasin—was described and illustrated in the "JOURNAL" a fortnight ago. During the past two years, however, effort has been turned in a different direction; and the result has been the production of the De Brouwer machine and the somewhat similar appliance in operation at the Villette station of the Paris Gas Company, which was described with such fulness last week. In both machines, as those of our readers who have perused the descriptions given of them are aware, the charge is blown into the retort in a continuous stream, and deposited upon the floor with the regularity of hand stoking. It is in the means employed for projecting the coal at the requisite speed that the machines differ; and it is claimed for the De Brouwer charger that it scores on the important point of simplicity in action.

The charger proper is outlined in the above illustration, and M. Laurain gave the following description of it: The chief feature is the wheel A, with a hollowed rim, of which the small figure is a section at M N. It consists of a rectangular cavity, marked by the letters D to G, with the bottom slightly rounded. This cavity is covered over one-fourth of the rim of the wheel T U by an ordinary leather driving-belt C. The two tongues *b*, sewn on the edge of the belt, are intended to strengthen the sides. Supposing the belt to be passed first over the driving-wheel B, and then over the guide-pulley O, there will have been formed at P R T U a channel of which the section is represented by the rectangle D E F G. If the wheel A is turned at a given speed in the direction of the arrow *f* (the other wheels turning as at *f'* and *f''*), the channel becomes movable; and if coal is introduced from the hopper T, as shown, the centrifugal force due to the speed of the wheel carries it to the point V, whence it is injected, in the direction of the arrow F, into the retort W. Between P and R the coal becomes caked together. When the stream of coal reaches the end of the retort, it is deposited in oblique layers, as shown at *i i' i''*, *j j' j''*. If the stream happens to be stopped for a moment, the surface of coal is always found to be oblique, as at I J. In the event of a temporary suspension of the supply of coal from the hopper, the shape of the stratifications is not affected; nor is it altered if the coal is thrown in piece by piece in succession. The wheel A does not act, in conjunction with the driving belt, as a breaker or even as a compressor, but simply as a producer of the centrifugal force which supports the coal upon the belt. When the charge is complete, the coal is found to lie at the angle I J, and the space between J and J' is absolutely free from dust. Consequently, nothing more is required than the closing of the retort-lid.

M. Laurain then directed the members' attention to what might be called two typical applications of the charger, shown on a plate attached to his paper, and reproduced in the diagram at foot. Fig. 1 is a section of a setting of 13-feet through retorts suitable for the employment of the charger and discharger. The hot coke is thrust out on to a conveyor, and that which comes from one of the middle retorts can be shot direct into the generator. The back mouthpiece does not carry any ascension-pipe; so that the introduction of water gas can take place at this point. Fig. 2 is an end view of the conveyor employed. An objection might be raised to this arrangement, that the generators could not be fed mechanically. In order to answer any such objection, there is shown in fig. 1 a skip working on a single rail, as devised by M. Godinet for the new retort-bench at Lyons. This skip would be filled under the elevator of the coke-conveyor.

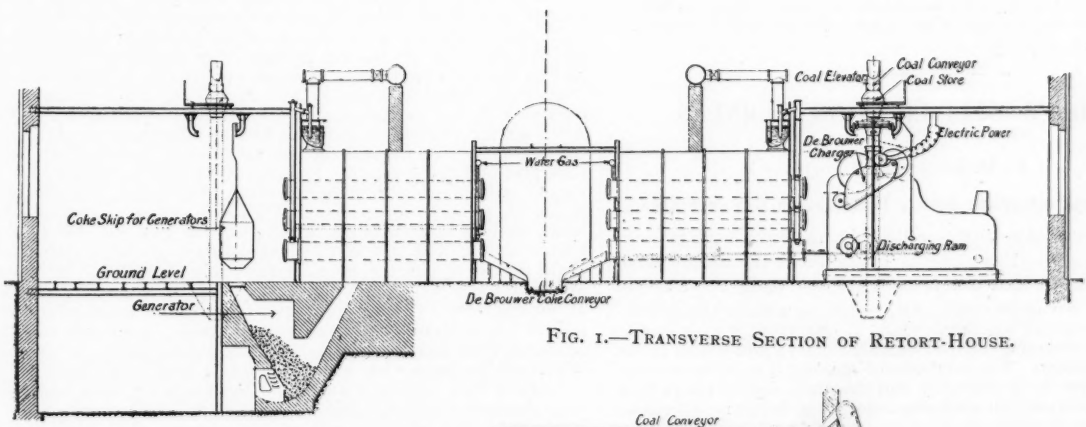


FIG. 1.—TRANSVERSE SECTION OF RETORT-HOUSE.

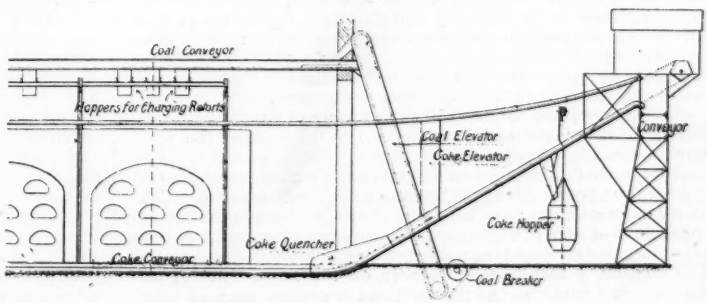


FIG. 2.—END OF THE CONVEYOR.

In conclusion, M. Laurain stated that the De Brouwer charger had been at work at Bruges for six months, while that of the Paris Gas Company had passed well out of the experimental stage. The results achieved, so far as the deposition of the coal in the retort was concerned, were indisputable. He invited his colleagues to inspect the De Brouwer machine at work.

GERMAN ASSOCIATION OF GAS AND WATER ENGINEERS.

Programme of the Annual Meeting.

The Annual General Meeting of this Association will be held, as already announced, from the 24th to the 26th of June, at Zürich, under the presidency of Herr Beer, Manager of the Berlin Municipal Water-Works.

The first day will be devoted to gas matters. The proceedings will be opened at nine o'clock by the President, who will deliver an Inaugural Address. This will be followed by short descriptions of the gas, water, and electricity works of the Municipality of Zürich, by the respective Managers of these undertakings—Herren A. Weiss, H. Peter, and H. Wagner. A joint communication will be read by Herr Wunder, of Leipsic, and Professor Bunte, of Carlsruhe, on the "Industrial Value of Gas Coals." Herr E. Drory and Herr E. Körting, of Berlin, will describe the new Mariendorf Gas-Works of the Imperial Continental Gas Association. Herr E. Salzenberg, Manager of the Crefeld Gas-Works, will describe their reorganization. Dr. A. Steger, of Amsterdam, will read a paper on "Water Gas, with special reference to the Processes of Doctors Kramers and Aarts." Herr Burgemeister, Manager of the Celle Gas-Works, will describe a "Simplified Process for the Purification of Gas, with Complete Recovery of Tar and Ammonia." Professor Renk, M.D., of Dresden, will give a communication on the "Hygienic Aspects of Gas Lighting." Herr A. Rothenbach, of Berne, will describe the gas-works of St. Margrethen and the supply of the surrounding communities by means of high-pressure gas-mains. Professor H. Aron, of Berlin, will conclude the proceedings of the first day with a paper on "Prepayment Gas-Meters."

The second day of the meeting will be devoted to water supply, and will comprise a paper by Professor C. Zschokke, of Aarau, on the "Utilization of Water Power in Switzerland;" a communication by Dr. Erlwein, of Berlin, on the "Sterilization of Drinking Water by Ozone;" and notes by Herr Meier, of Gerlafingen, on "High-Pressure Water-Mains."

Other matters to be dealt with on these or the following days are the reports of the numerous Technical Committees appointed by the Association. Herr Thomas, Manager of the Zittau Gas-Works, will present the report of the Committee on Photometry; Herr Söhren, of Bonn, that of the Gas-Meter Committee; Herr L. Körting, of Hanover, that of the Committee on Heating; Herr M. Niemann, of Dessau, that of the Committee on Standard Dimensions for Gasholders; Herr Lindley, of Frankfort-on-the-Main, that of the Committee on Protective Measures to be adopted against Vagrant Electric Tramway Currents; and Herr W. Oechelhaeuser, of Dessau, that of the Committee on Technical Training. Further, Herr Joly, of Cologne, and Herr Wellmann, of Charlottenburg, will present the reports of two Committees dealing with water questions; and Herr Lindley will read the report of the Committee on Standards.

The usual routine business, including the election of President for the ensuing year, and the selection of the place for next year's meeting, will be transacted. A local Committee have undertaken the arrangements for the forthcoming gathering, including a special programme for ladies, and a number of social functions, including a reception on the evening of the 23rd. Visitors will, as usual, be welcome to the meeting.

CANIONI'S SELF-LIGHTING BURNERS.

By M. Auguste Lecomte.

[A Paper read before the Société Technique du Gaz en France.]

There is no need to insist on the advantages of coal gas over other illuminants. Especially in reference to the incandescent systems it may be said that it lends itself to many applications. It lights and warms in winter, and serves as a means of ventilation in the heat of summer. Only in one respect may gas be considered deficient compared with electricity; and that is in not being self-lighting. The methods of making it so have received much attention from engineers and chemists, and at the present time we can classify their efforts under three heads: (1) Ignition by a pilot flame; (2) ignition by electricity; and (3) automatic or chemical ignition. The first method entails the constant combustion of a small flame and some mechanism, such as clockwork or compressed air, by which the supply of gas to the burner itself may be turned on or shut off. For this reason the pilot-flame system is a partial and expensive solution of the problem, apart from the fact that the small flame itself is easily extinguished, and hence the certainty of the lighting is largely discounted. Electricity is an advance; but whatever shape be given to the igniting apparatus—a wire of high resistance, an induction spark, or what not—an expensive and complicated installation is necessitated. The essence of self-lighting burners, on the other hand, is that the gas itself performs the ignition, and in certain kinds of apparatus admits the supply of gas to the burner. Lighting by means of platinum black (spongy platinum) was the subject of a paper by M. Syssoyeff before the Society in 1898. M. Pierron handled the same question at the International Congress of Applied Chemistry in 1900, and a report was drawn up in regard to the subject by a Committee of the Société Technique in 1901.

The catalytic action of platinum in inducing the combination of hydrogen and oxygen without itself taking any permanent part in the reaction was in the first place noted by Berzelius. His observations were extended by Davy and Döbereiner, and were first of all applied by Gay-Lussac in his *briquet à hydrogène* (hydrogen tinder-box). The most varied substances have been used as supports for the platinum black—meerschaum, magnesia, asbestos, clay, the material of the incandescent mantle, and pure oxide of thorium. The perfect substance must be porous enough to be impregnated with the platinum black, and must retain this property for a lengthened period. Platinum black pure and simple is not sufficient, as in the flame it assumes only a dull red heat. It must be united with extremely fine platinum threads. These, when once heated by contact from a pilule or fragment of platinum black, acquire the property of condensing the gas, becoming white hot, and igniting the gas. The thread is inactive when cold; it needs a slightly increased temperature to bring it into the right molecular condition. Self-ignition thus takes place in two stages. In the first, the active pilule (of platinum black) condenses the gas and comes to a dull red heat, transferring this heat to the threads of platinum in contact with it; while in the second phase, the threads, rendered active by this heat, condense the gas with greater vigour, and, reaching a white heat, cause ignition. The essential quality of the device is the permanent activity of the pilule.

The manufacture of the pilules is based on a number of facts. First, other metals than platinum are used. Palladium is twice as active; and iridium and other metals of the rare earths can be used. With the object of resisting the effects of damp, or of overcoming the slow absorption of oxygen from the air, other substances, absorbing moisture and oxygen, have been combined with the catalytic metals. But few of the many processes have proved permanently valuable. Palladium, while it is most active, volatilizes at 1500° C. Iridium is less active; and although its melting-point is much above that of platinum, the author has seen the iridium with which the Killing self-lighting mantles are impregnated disappear in the hottest part of the flame of an incandescent burner. Platinum, if used in adequate quantity on a sufficiently porous support, remains the material to be preferred. M. Canioni continues to use it, preparing his support for it as follows: Aluminium hydroxide is precipitated in the gelatinous state from the salt of the metal, and after pouring off the clear liquid, the residue is dried until it can be moulded, in an agate mould, into small cylindrical and perforated pilules. These are ignited in a muffle furnace for several hours, and are obtained as absolutely anhydrous and highly porous alumina. Before they have the opportunity to absorb the slightest trace of moisture, they are immersed in a 10 per cent. alcoholic solution of platinum chloride. Their impregnation by this solution lasts about a fortnight, at the end of which time each pilule has absorbed the quantity of platinum determined beforehand, and the process of manufacture is completed by igniting the pilule in a gas-flame. It is mounted for use as described later.

Several tests made by M. Canioni as to the permanent activity of the pilule are deserving of notice. One pilule thrust in the hottest part of the flame of a bunsen burner for ten months, night and day, was found at the end of the time to be quite black, and to fully retain its igniting powers. An igniter was placed in an iron cylinder, the bottom of which was wetted. Cotton wicks were hung within the cylinder, and in this manner a maximum dampness of the air surrounding the igniter was brought about. After leaving the igniter for three hours under these conditions, the gas was turned on, and the results carefully noted. Nothing took place for five seconds. Then the two pilules emitted a slight vapour, arising probably from the water absorbed. This ceased at the end of six to seven seconds. Then the pilule reached a red heat; and 24 seconds after turning on the gas, the flat-flame burner was ignited. It may sometimes happen that, owing to a slight escape of gas, the pores of the pilule are filled. All that need be done, however, is to blow sharply on the pilule, which then at once ignites. The average times required for ignition are as follows: Slow igniter for incandescent burners, 14 seconds; rapid igniter without valve, 4 seconds; and flat-flame burner, 5 seconds. These are the times after an interval of 23 hours each day.

Igniters take several forms; and in describing those which I have devised, I wish to give prominence to M. Canioni's absolutely novel idea which is carried out in them. This idea is to use the expansion of a column of mercury enclosed in a glass tube (encased in an outer iron tube) for admitting and withdrawing the gas supply. In the first model shown (fig. 1), the igniter lights the gas by a small pilot-flame, which in turn ignites the main supply, and in so doing extinguishes itself. Referring to the diagram, the appliance is attached to the gas service-pipe at A, and B is the portion on which the incandescent burner is fixed. C is the elbow by which the gas is conveyed to the pilot-light, D the valve admitting gas to the burner, E a lever commanding the valve, F a rod transmitting motion from the lever, G an india-rubber bag, H a glass tube filled with mercury, I, J an iron protecting tube, K a copper extension-piece deriving from the flame the heat necessary to expand the mercury, L the screw connection

for attaching the expansion system, M the pilot burner, N the pastile lighter, and O the pilule.

The action is as follows: When the gas is turned on, it cannot find its way past the valve D, and therefore it flows through C, round the rod F, and emerges at the pilot burner M and igniter N. The latter becomes red hot, ignites the gas, and the flame in turn ignites the gas in M. The flame of the latter heats the extension-piece K; and the heat, constricted by the tube J, expands the column of mercury within the glass tube H. The mercury can expand only at its lower end, where it terminates in

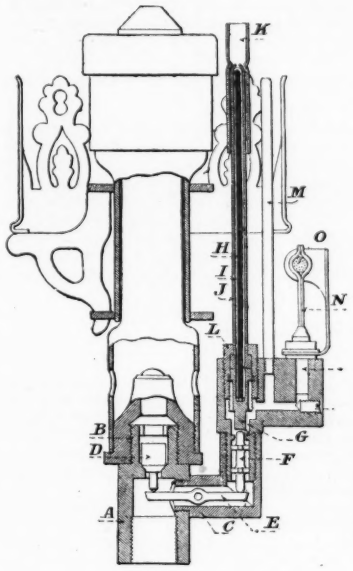


FIG. 1.

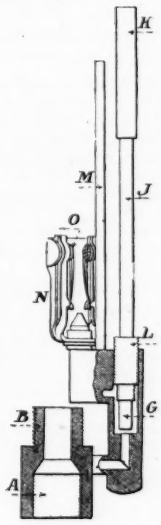


FIG. 2.

a rubber bag. This latter therefore becomes enlarged, and depresses the rod F, and through the lever E opens the main valve D. The gas can now pass direct to the burner, and is at once ignited by M. The heat expands the mercury still more, and so admits the full volume of gas to the burner. On extinguishing the light, the mercury contracts, the rubber bag contracts, and once more opens the way for the gas to the small burner and the igniter.

A direct form of igniter, suitable for exterior lighting, factories, and public thoroughfares, is seen in fig. 2. The gas passes to the burner proper, the pilot burner, and the igniter. The bag G closes the passage to the second burner when the main supply has been ignited.

The self-lighting burner finds a very neat application in the illuminated signs now so extensively used in street advertisement. Hitherto electricity has been exclusively employed for the appearance of the word or words required letter by letter; but M. Canioni has succeeded in gaining the same effect with the auto-burner. The gas consumption for the particular models shown amounts to 1·2 cubic metres (about 42 cubic feet) per hour for a word of ten letters. But it is found that, taking into account the periods of extinction, the actual consumption is only half this quantity; and the cost is therefore: 0·6 cubic metre × 20c. = 12c. For electricity, twelve lamps, each of 5-candle power, are necessary—*i.e.*, ten lamps per letter—in order to give the same lighting (60-candle power) as that of the auto-burner. Taking the cost of the electric light at the moderate figure of 8oc. per kilowatt, the hourly consumption is 2440 watts. Taking half of this, we find the cost to be 1·220 × 8oc. = 97·6c., or more than eight times that of gas. The expenses of maintenance are in the same ratio as before, inasmuch as there are 12·2 electric lamps for 10 mantles; and the life of the mantle in an apparatus of this kind is quite equal to one used in an incandescent lamp.

PURIFICATION QUESTIONS AT THE SOCIÉTÉ TECHNIQUE MEETING.

At the Meeting of the Société Technique last week, three of the papers which came before the members dealt with purification questions. The salient features of the communications are indicated in the following abstracts.

Washing and Purifying Gas.

"A Laboratory Appliance for the Washing and Purification of Gas" was the subject of a note by M. Chevalet, who has devised this means of testing the two above-named operations on the experimental scale. The apparatus consists of one or more supports, each carrying a perforated plate to arrest tar or ash with the aid of a little water. The plates can be readily changed while the apparatus is *in situ* by means of an aperture closed by a plug. Three plates, as mentioned in a paper read to the Society in 1881, suffice for the total removal of the tar, which collects in a chamber under the last plate, and flows away therefrom with the wash water, to be afterwards drawn off, weighed, or measured. Above the perforated plates several supports are mounted, each carrying a shallow plate, which holds a small quantity of water. On these plates are laid wooden shavings, or other materials offering an extended surface. A cover with a hole in it encloses the apparatus, and carries a funnel with a small syphon for the introduction of wash water. All the parts are turned, and the complete apparatus is put together by means of mastic or white lead. The diameters of the two instruments already made are 7 inches and 12 inches respectively. By replacing the shallow plates by discs of perforated sheet iron, on which is spread lime or oxide of iron, the apparatus serves as a purifier. The smaller one will wash from 35 to 70 cubic feet of gas per hour, according to the number of cylindrical sections in it. The 12-inch apparatus will deal with from 100 to 300 cubic feet per hour under the same conditions. If it is used as a purifying column, the apparatus should have a superficial area about four times that of the washer above described.

Cyanide Extraction.

In a short paper, M. Oscal Guillet, of Besançon, recorded the results of a year's practical working of the method of cyanide extraction communicated by him to the Society at last year's meeting, since which time the process has been in operation at his works. The apparatus employed was an ordinary "Standard" washer-scrubber, save that eight compartments were provided—the first three serving for the preliminary washing out of part of the ammonia, and the following five for the extraction of the cyanides. Means were taken to keep the cyanide liquor at a constant level; but scarcely any further modification was needed. The preliminary removal of ammonia proved to be extremely energetic; liquors often being obtained having a density of 10·5°, and never less than 7°, Baumé. Two of the three compartments usually sufficed for the washing, without appreciably altering the density of the water added when the time arrives, not gradually, but in one large dose. Knowing the temperature and the proportion of ammonia to cyanide (which may vary from 0·6 to 0·9 per cent.), smooth working of the process is soon acquired, and its progress can be easily regulated.

On emerging from the apparatus, the gas is so completely cleared of its ammonia that it will not turn litmus paper blue—a result of the excess of sulphate of iron kept in the last compartment. As one division is cleared in 24 hours, the solution remains in contact with the gas for five days; and so long as the average composition of the gas during this time is about that named above—*i.e.*, 0·6 to 0·9—the recovery of the two products goes on without appreciable loss, and the influence of great variations in the external temperature to be feared under ordinary conditions is practically abolished. A solution of sulphate of iron as strong as 40 per cent. can be used in the apparatus—a fact which, in practice, is the same thing as an increased capacity of the washer.

In works adopting continuous revivification, the air or oxygen should be introduced after the washing rather than before, as the "sulphided" solution absorbs a part of it. In ordinary work, a supersaturated liquor in the washer is aimed at, as leading to perfectly pure sulphate and cyanide. When thus supersaturated, the liquor is tapped off by a well into a wooden tank, where it is acidified in the cold with sulphuric acid, with the object of precipitating the cyanides in the insoluble form. Sulphate of iron is then added, and the insoluble pure cyanide is left suspended in a solution of pure sulphate of ammonia. The two products are separated in a filter-press; the cyanide washed and dried for the purchaser; and the solution evaporated to a sulphate which is white, not grey.

The whole plant is simple in construction, and, with the exception of the filter-press, was put together on the works by ordinary hand labour. It occupies a small building, about 11 ft. 6 in. by 29 ft. 6 in., in which there is also room for storing 10 tons of sulphate of ammonia and 5 tons of cyanide. It may be added that several small works might utilize the process between them; the one of the group most centrally situated being equipped with the recovery plant.

Sulphur in Coal and Coke.

In the course of some notes on the form assumed by sulphur in coal and coke, when these materials are burnt in a gas-producer, M. Lencauchez reminded his hearers that, whether present in the combustible as iron sulphide (FeS) or as pyrites (FeS_2), the sulphur passes forward with the gas as sulphuretted hydrogen, and that its subsequent appearance in washers or scrubbers, at any stage of the process, as elemental sulphur, is due to the oxidation of the gas by air—hydrogen being removed from the sulphuretted hydrogen to form water, and the sulphur appearing as a milkiness of the liquors—

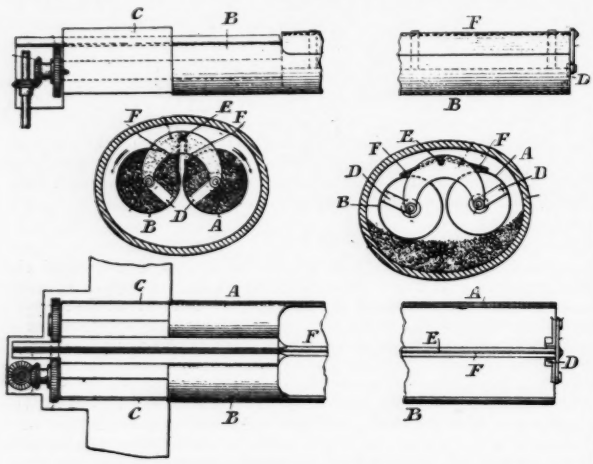
$$2\,H_2S + O_2 = 2\,H_2O + S_2.$$

The sulphuretted hydrogen can be removed from the producer gas by means of this reaction—the gas being brought into contact with the right quantity of air as it is being washed; or oxide of iron may be used to absorb the sulphur compound.

REGISTER OF PATENTS.

Retort-Charging Apparatus.—Pfeiffer, A., of Hedelfingen, near Stuttgart, Germany. No. 971; Jan. 14, 1903.

This apparatus for charging retorts consists of two revolable scoops which lie close together and are provided with recesses or openings. Between the scoops are arranged two vertically upright revolable flaps or valves allowing of an increased charge of the scoops, and which scoops, when the retorts are fed, discharge outwardly so that the coal falls laterally into the retorts, and distributes itself uniformly.

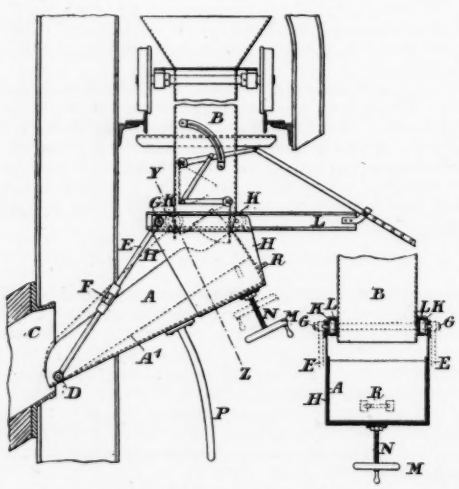


The scoops A and B are revolably held in front in a frame C, which is mounted on the machine for drawing out, inserting, lifting, lowering, and turning. At the rear end, the scoops are provided with an elbow-piece D pivotally mounted by bolts on a bent arm. The part lying inside the retorts after the scoops have been inserted in same is recessed in the ordinary manner. In front, cog wheels are firmly mounted on the scoops, which gear with one another, and may be turned by bevel gear or other suitable arrangement. Between the two scoops, but above them, a rod E is carried along their entire length, fixed in front of the frame and in the rear on the bent arm, and held between the two ends by means of arms fixed on the scoops. On this rod there are revolably suspended two flaps or valves F close to one another, which rest beneath against the interior of the scoops. After inserting the filled charging-scoops into the retorts, and turning them, the discharge takes place. Valves F then rest externally on the scoops and assume their previous (vertical) position only after the scoops have been turned back again. The uniform discharge of the scoops is effected in so short a time that their withdrawal and the closing of the retort is said to only require from about ten to twelve seconds.

Charging Inclined Retorts.—Herring, W. R., of Edinburgh. No. 12,747; June 4, 1902.

This invention relating to coal charging-shoots for use in connection with inclined retort installations, is intended to provide means for varying the inclination of the traversing shoe so as to accommodate the varying physical characteristics of the coal used—such variation in inclination being under the control of the attendant, and being capable of rapid adjustment by him, either prior to or during the actual operation of charging.

A side elevation of the shoot in position is shown; also a cross-section on the line Y Z.



A is the shoe, secured beneath the body of the travelling shoot B, and projecting into the mouthpiece C of the retort. The nose of the shoe is pivoted at D, and suspended at each side by a link E, adjustable at F. The upper ends of the suspension-links E are attached at G to the side plates of the hood H, upon which the trolley wheels or runners K are fixed; these wheels or runners working upon, or within, guide rails L attached to the lower part of the body of the shoot. The suspension-links E serve, therefore, not only as a means of pivoting the shoe, but also of adjusting the level of its nose to overcome the slight inequalities in level of the various retorts.

The upper end of the shoe, enclosed within the hood H, moves up and down in accordance with the adjustment of a hand-wheel M and screw N. So that the coal, descending from the body of the shoot, strikes the base of the shoe, and is directed into the retort at whatever angle the shoe may have been adjusted for.

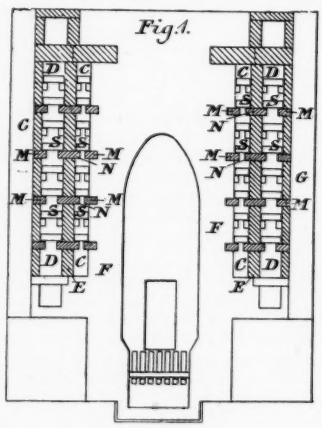
When the apparatus is used in connection with the upper tier of retorts, the handle P is fixed beneath the shoe; when applied to the middle and lower tiers of retorts, a handle R is attached to the end plate of the shoe.

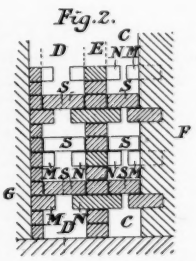
Incandescent Mantles.—Schottmann, F. C., of Randers, Denmark. No. 11,280; May 16, 1902.

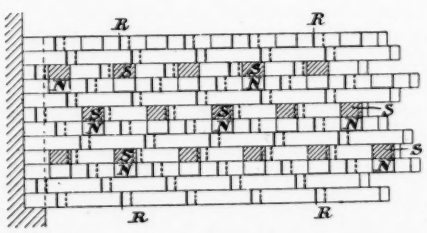
The object of this invention is to manufacture a mantle which has the smooth side or surface of the fabric turned towards the inside, while the rough side forms the outside—either by knitting the mantles so that the right and wrong side respectively are from the outset arranged accordingly, or by reversing the ordinary mantles prior to, or after, impregnation. It is said to have been demonstrated by photometrical measurements that the illuminating power, and also the power of resistance, of the mantle made in accordance with this invention increases by 10 to 15 per cent. as compared with mantles hitherto in use.

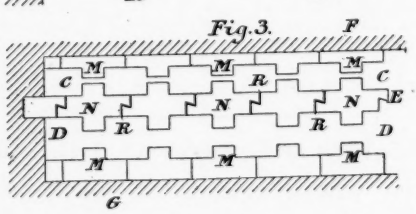
Regenerative Furnaces.—Graham, Maurice, of Leeds. No. 12,445; May 31, 1902.

This invention relates more particularly to the construction of the feather-wall between the secondary-air flue and the waste-gas flue of regenerative retort-furnaces, so as to allow of their being made of a minimum thickness consistent with air-tightness. Fig. 1 is a transverse section of a regenerative furnace in connection with an inclined-retort setting. Fig. 2 is a transverse section of the wall and flues. Fig. 3 is a longitudinal section and plan.







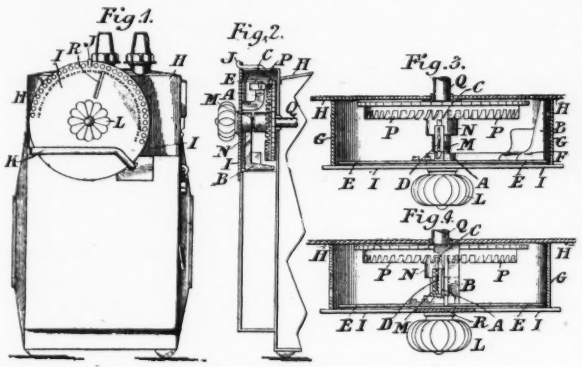


C are the secondary-air flues up which the hot air passes; D the waste-gas flues from the setting; and E the feather-walls. These feather-walls are preferably one brick in thickness; and the whole of the vertical joints R are rebated or dovetailed so as to ensure perfect air-tightness and complete bonding of the wall. At suitable intervals in the height of the wall, courses of cross-shaped bricks N are laid—projecting from each side of the wall into the secondary-air flue and the waste-gas flue. Upon the projections of the bricks, and upon corresponding projections M in the producer side-wall F and the pier-wall G, are laid transversely in the ordinary manner a series of bafflers S, which intercept the passage of the air and waste gases, and which, in combination with the rebated or dovetailed joints R, serve to support and strengthen the feather-wall.

Coin-Freed Meters. — Glover, T., of Clerkenwell. No. 13,367; June 12, 1902.

This invention refers to gas-meters where the coin forms the connection between the actuating handle and the mechanism, and specially relates to patent No. 25,272 of 1894, in which the coin falls into a pocket and finds a lodgment between the walls of the pocket and the teeth of the operating wheel; the object being to prevent surreptitious movement of the toothed wheel to actuate the mechanism by an instrument inserted through the coin-slot when open.

Fig. 1 is a front elevation of the meter. Fig. 2 is a part side sectional elevation; the locking mechanism being in the unlocked condition. Fig. 3 is a plan of the locking mechanism, and with sufficient of the coin-actuating mechanism to illustrate the invention; the locking mechanism being in the unlocked position. Fig. 4 is a similar view to fig. 3, but with the locking mechanism in the locked position.



Pivoted or otherwise connected to the projecting stop A (which limits the movement of the coin-pocket B) is a catch or bolt C, controlled by a spring D to keep it normally in the unlocked position. On the coin-pocket B (or it may be on the ring shield E) is fixed an angled or other projection F, for a purpose to be hereafter explained.

G is the casing forming part of, or affixed to, the meter proper H for containing the primary coin-actuating mechanism. The casing carries at its front part a price-changer plate I (as described in the 1894 patent) fixed to the casing G by the hook J and rod K as usual. The centre of the plate carries a handle L, the spindle M of which finds a bearing in the boss N of a faced and edged toothed wheel P. This is in turn secured to the axle Q connected with the other coin-freed mechanism and the meter mechanism, as will be understood by reference to the earlier patent The axle M also carries the coin-pocket B and the ring slot shield E, which is provided with a slot to coincide with the coin-slot R.

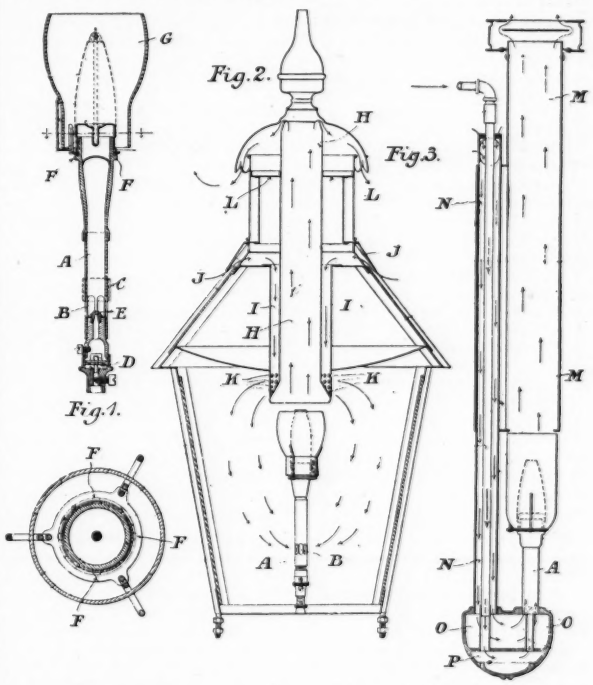
According to fig. 3, the belt or catch C is in the normal condition (unlocked), and the coin-slot R closed by the shield E; the mechanism only being actuated through the meter-bellows. When it is desired to insert a coin to actuate the mechanism, the handle L must be turned back until the slot in the shield E coincides with the slot R in the price-changer I. Just before the slots begin to coincide, the angled face of the projecting lug F will act upon the bolt C, and cause its opposite end to enter between two teeth of the wheel P (as fig. 4); and thus lock the wheel while the coin-slot is open, and prevent all actuation of the wheel by tools inserted through the coin-slot, as it is not until the coin-slot is closed that the projection F is free of the bolt to allow the spring D to return the bolt to its normal position as in fig. 3.

Burners and Lanterns for Incandescent Gas Lighting.—Holgate, T., of Halifax. No. 13,902; June 19, 1902.

This invention—having reference to "improvements in the method of, and apparatus employed in, the combustion of gas for lighting by the incandescence of refractory materials in the form known generally as incandescent mantles"—applies to three types of burner: Firstly, to a burner where the gas and air are not preheated by any special device; secondly, to a burner where the gas is not preheated, but where the air is preheated by the out-going gases in their passage from the mantle; thirdly, to a burner where both the gas and air are preheated by the out-going gases.

It will be understood (says the patentee) that the factors governing the efficiency of an incandescent gas-burner are the proper control of the quantity of gas passed into the burner and the proper application and control of the requisite air supplies. It has hitherto been considered necessary, in order to obtain high efficiency, to have the gas flowing f om the jet at a comparatively high pressure. He finds this, however, "to be an erroneous idea, as, by the proper application and control of the air supply, to a properly controlled gas supply, very high efficiency can be obtained with a comparatively low gas pressure." Fig. 1 is a sectional elevation and plan (enlarged) of a burner for incandescent gas lighting constructed according to this invention. Fig. 2 shows an arrangement applied to a street-lantern, wherein the air supply is preheated by the outgoing products of combustion. Fig. 3 shows an arrangement wherein both the air and gas supplies are preheated.

The mixing-tube A of the burner is of a diameter proportionate to the quantity of gas to be burnt; and of a length equal to approximately five or six diameters above the air-admission openings B the tube is made parallel. It is then expanded to the size required by the diameter of mantle employed, or (preferably) a separate head of thicker metal is employed, as in this way the burner-head becomes hot and imparts heat to the incoming gas and air; thus increasing the efficiency of the burner. The interior of the tube is preferably left roughened, as it is found that this facilitates the admixture of the gas and air. The air-admission openings are made much larger than at present, and vary in area for different diameters of tubes. If desired, an adjustable cap or cover C may be employed to permit of restriction of the air-admission openings in certain cases where necessary. The control of the gas supply is (preferably, but not exclusively) obtained by the use of a governor D made integral with the burner; the jet E forming part of, or being attached to, the upper portion of the governor. Between the governor and jet is a small testing hole closed by a screw, so that, when desired, by removing the screw, and inserting a small tube into the testing hole, the exact pressure at which the gas is passing to the jet can be ascertained. Only a certain quantity of air can be admitted through the openings B—determined by the tendency of the combustible mixture to "light back." There is therefore provided a supplementary air supply at the burner-head as follows: The burner-head is made with a number of projections or wings F adapted to support a thin annular cap of metal or other suitable material. This cap passes inside the mantle; and it is provided with a number of small projections which form between the burner-head and the inner side of the cap passages leading to the interior of the mantle. The upward flow of hot gases in a state of combustion draws in through these passages a supplementary supply of air to the interior of the mantle; thus obtaining more efficient combustion without increasing the tendency to "light back." The supplementary air supply, moreover, maintains the efficiency at a more uniformly high figure where there is within certain limits a varying proportion of gas and air admitted below, and passing up the mixing-tube. In addition to the air supplies already mentioned, a further supply is necessary to the exterior of the mantle. This is effected by the employment of a special form of glass mantle protector G, having its lower portion contracted to give a certain clearance for the admission of air. The amount of the clearance is determined by the presence or absence of a chimney resting upon, or more or less distant from, the mantle protector, and the patentee finds this "has an effect upon the quantity of air drawn in past the contracted portion of the mantle protector."



Referring now to fig. 2, wherein the air supply is preheated by the outgoing gases. The waste gases from the mantle pass up a chimney or gases outlet passage H, suspended centrally of the lantern above the burner, surrounding which passage J is a concentric tube or chamber L. The air supply enters the lantern through the openings, and passes into this tube or chamber. The air passes down the tube, and thence into the body of the lantern through openings K, having become heated in its passage down the tube I through contact with the heated surface of the gases outlet passage. The division-plate L prevents the outgoing gases from mingling with the incoming air supply.

Fig. 3 shows the arrangement where both the gas and air supplies are preheated by the outgoing gases or waste products of combustion. The waste gases pass up through a chamber M, through which the air supply-tube N is passed. The gas supply-tube is carried down inside the air supply-tube, or it may, if preferred, be outside the tube and inside the chamber M. The air-tube opens at its base into a chamber O formed in a casing; and the gas supply-tube opens into a chamber P in the casing whence the gas is conducted by a tube to the burner the lower end of which opens into the chamber O to receive the air supply. The mixing-tube of the burner in this arrangement is made of increased diameter, to allow for the expansion of the gas and air due to the heating.

Malta and Mediterranean Gas Company, Limited.—The report of this Company for the year ended March 31 states that the balance of the general revenue account is £5300. The Directors recommend the payment of the usual dividends on the first and second preference capital, and a dividend of 3 per cent. on the ordinary capital; making, with the interim dividend paid in December last, 5 per cent. for the year, and leaving a balance of £1182 to be carried forward.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Price of Gas for Power Purposes.

SIR,—The following table shows that during the year 100 million cubic feet of gas were sold at a price of 30d. per 1000 cubic feet, and that the net profit in aid of rates or for dividend purposes was £2083 6s. 8d. Of the above quantity, supposing 90 million cubic feet, or 90 per cent., had been sold for lighting purposes at the usual price (viz. 30d. per 1000 cubic feet), and the remaining 10 per cent. for other purposes at 27d., the net profit would have been £1958 6s. 8d.—*i.e.*, £1875 and £83 6s. 8d., or less by £125. This difference would perhaps have been anticipated at the beginning of the year by those having the management of the undertaking; but, whether or not, the result would be that either the lighting consumers or the owners of the works, for the benefit of the power and heating consumers, would have to make it up—the lighting consumers by a charge of 30·33d. per 1000 cubic feet (£125 ÷ 90,000 = 0·33d.), or the owners of the works by increased rates or reduced dividends:—

	Actually Sold for both Lighting and Cooking, and other purposes, 100 million cubic feet at 30d. per 1000.	Estimated as Sold for Lighting only, 90 million cubic feet at 30d. per 1000.	Estimated as Sold for purposes other than Lighting, 10 million cubic feet at 27d. per 1000.
Net cost of gas . .	£7083 6 8 = 17d.	£6375 0 0 = 17d.	£708 6 8 = 17d.
Gross profit—			
Capital charges .	2708 6 8 = 6·5	2437 10 0 = 6·5	270 16 8 = 6·5
Reserve . . .	625 0 0 = 1·5	562 10 0 = 1·5	62 10 0 = 1·5
Rates of dividend	2083 6 8 = 5·0	1875 0 0 = 5·0	83 6 8 = 2·0
Revenue from gas .	£12,500 0 0 = 30·0	£11,250 0 0 = 30·0	£1125 0 0 = 27 0

It is sufficient to point out that if any consumer has gas at less than the ordinary selling price, the difference has to be made good somehow, and that such a course does not tend to bring about a general reduction to the main body of consumers.

May 20, 1903. H. B.

The Law and Practice Relating to Test Gas-Burners.

SIR,—We have carefully followed the arguments adduced in your article on the above subject in this week's "JOURNAL." We feel that no good can be done to the gas interest by publishing or combating in a public journal such statements, in view of the uses to which such information can be put by parties antagonistic to the statutory gas interests, which you are generally considered to represent. And it is for this reason that we refrain (even at the risk of appearing cryptic) from pointing out the very weak spots in your reasoning. It is of no use whatever to try and square what are two separate and distinct problems—namely, first, "What is the proper way to test a particular gas?" and, secondly, "What is the relative value (in illuminating power) of different makes and qualities of gas?" This is just what gas companies' opponents are trying to do.

Your article on "The Relation between French, German, and English Photometric Measurements" raises a point very germane to the above-mentioned subject. But is there not a way at hand out of the difficulty due to multiplicity of methods and multiplicity of standards—namely, the calorific unit, which will compare a gas made in England with one "made in Germany" without any apparatus-errors, and in terms that are strictly comparable, and which can be reduced to a common basis?

May 22, 1903. SIMMANCE AND ABADY.

Gas Profits and Electricity Losses at Devonport.—The Finance Committee of the Devonport Corporation were engaged last week in what one of the local newspapers described as the task of "wrestling with the estimates," in the hope of so reducing the coming year's expenditure as to prevent a large increase of the rates. One unpleasant fact which confronted the Committee was that the electricity undertaking shows a deficit of £2000. On the other hand, the Gas Committee, at the end of their first year's management, were able to report a net profit of £827. The total income was £49,797 (of which £35,155 was from sales of gas), and the expenditure £41,582; leaving a gross profit of £8215, from which had to be deducted the capital charges of £7388. The capital expenditure to the 31st of March was £194,476, of which £147,679 represents the actual cost of purchasing the works from the Company. The gross profit on the capital employed was £4 4s. 6d. per cent. The Town Council have still to decide what they will do with the net profit, though there is little doubt it will go to the borough fund to help to keep down the rates.

Colne Gas Supply.—When presenting the annual financial statement at a special meeting of the Colne Town Council last Wednesday, Alderman S. Catlow, J.P., the Chairman of the Finance Committee, stated that during the past year the total quantity of gas made was 143,039,000 cubic feet, or an increase of 2·58 per cent.; the amount of coal carbonized being 12,803 tons, as compared with 12,575 tons the previous year. The capital expended was £3897, which brought the total value of the works to £112,839, of which £19,618 had been repaid. The expenditure on revenue account for the twelve months amounted to £18,431, against £17,326; while the income from gas and rents was £18,362, or £440 more, and from residuals £6221, or £327 more. The total income from all sources was £25,145, which left a gross profit of £7714. Interest on capital and contributions to sinking fund absorbed £5145; and there was a net profit of £1569, to which had to be added the cost of street lighting (£1400). The gross profit was equal to 8 per cent. on the outstanding loans. During the past ten years, the contributions to the rates and general reserve fund from the gas-works had been £31,202, of which amount £20,978 had been given during the last five years. In other words, gas consumers had been contributing the equivalent of a 10d. rate each year.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills brought from the Commons, read the first time, and referred to the Examiners: Crystal Palace District Gas Bill, Ebbw Vale Water and Improvement Bill, Gaslight and Coke Company Bill, Hampton Court Gas Bill, Leigh Corporation Bill, New Hunstanton Improvement Bill, Newcastle-upon-Tyne Electric Supply Bill.

Bills read a second time and committed: Commercial Gas Bill, Gas Orders Confirmation Bills (Nos. 1 and 2), Scarborough Gas Bill, Walker and Wallsend Union Gas Bill, Water Orders Confirmation Bill.

Bills reported: Bridgwater Gas Bill, British Gas Light Company (Norwich) Bill, North Middlesex Gas Bill, Sutton District Water Bill, Torquay Corporation Water Bill.

Bills read the third time and passed: Belfast Water Bill, East Ardsley Gas Bill, Maidstone Gas Bill, Scunthorpe Urban District Water Bill, Shepshed Urban District Gas Bill.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills brought from the Lords, read the first time, and referred to the Examiners: Belfast Water Bill, Scunthorpe Urban District Water Bill, Shepshed Urban District Gas Bill.

Lords Bills, read a second time and committed: Harrogate Water Bill, Harrow and Stanmore Gas Bill, Wellington (Salop) Gas Bill.

Lords Bill reported: Faversham Gas Bill.

Bills read the third time and passed: Crystal Palace District Gas Bill, Ebbw Vale Water and Improvement Bill, Gaslight and Coke Company's Bill, Hampton Court Gas Bill, Leigh Corporation Bill.

A Bill to confirm a Provisional Order, under the Burgh Police (Scotland) Act, 1892, relating to Broughty Ferry Gas, was brought in on Tuesday, read the first time, and referred to the Examiners.

GLEANINGS FROM THE COMMITTEE ROOMS.

THE past week in the Parliamentary Committee rooms has been almost an uneventful one in gas and water. The principal happenings will be found set forth below; but here the attention of gas suppliers may be particularly directed to the paragraph referring to the success of the Gaslight and Coke Company in their effort to ensure that the electricity supply undertaking of the Willesden District Council shall be conducted on proper business principles, and to the one dealing with the protection of gas-mains against damage by electrolysis.

The Strange Case of Crewe. Crewe is in a peculiar position in regard to its gas supply. The residents are furnished with gas by the London and North-Western Railway Company from their private works, the production of which to the extent of two-thirds is consumed by the Company themselves. The Company are under no obligations as to supply, price, or quality; and they are only able to open the streets by the grace of the Corporation. In an Omnibus Bill which they are promoting this session, they sought power to open the streets of the town without the consent of the Corporation, which power the latter did not think it was expedient they should have unless they had imposed upon them the ordinary statutory obligations attaching to gas supply. Before the Earl of Camperdown's Committee last week, the unique position was argued; and Counsel on both sides, and Mr. Corbet Woodall for the Corporation, were in accord in saying that, within their knowledge, the power sought was unprecedented in the case of a non-statutory gas company. All that could be said in favour of the Company was said; but their Lordships properly agreed that statutory privileges should carry statutory obligations, and so they deleted the contested clause.

Making Electric Supply Self-Supporting. The raid which is being made in the Committee rooms against unbridled municipal trading is making headway. Without much effort, Mr. Balfour Browne succeeded last Friday in gaining, for the Gaslight and Coke Company, even without calling evidence, the insertion of the Bermondsey clause in the Willesden District Council (Further Powers) Bill, one part of which referred to electricity supply. The South Metropolitan Company were the first to get the clause in question inserted in the Bermondsey and Woolwich Acts; and this Willesden success is the second made by the Gaslight and Coke Company—the former one being the case of Stoke Newington. The effect of the clause is, as readers should by this time well know, to make electric supply undertakings absolutely self-supporting, and to exempt the ratepayers from contribution to this speculative form of municipal trading. Mr. Balfour Browne argued that municipal trading should not be allowed to go any farther without protecting those who are entitled to protection. In the case of the Gaslight and Coke Company, their mains in the district of Willesden are rated at several thousands, and yet the Council could compete with them, take away their customers, and then, if their hazardous venture proved unsuccessful, call upon the Company (if protection were not granted) to contribute to any deficiency. Counsel also asked the Committee to prevent the Council supplying electricity outside their district, seeing that it was quite foreign

to the duties of a local authority to speculate with the ratepayers' money by the provision of large works for the supply of the district of another authority; to deny the Council the right to supply apparatus and fittings free; and to protect the Gaslight and Coke Company and the other ratepayers by the insertion in the Bill of some such clause as that already indicated. The result was that their Lordships (over whom Lord Brougham and Vaux presided) declined to allow the Council to supply outside their district, insisted on the insertion of the Bermondsey clause, but, under the circumstances, they did not see any reason for refusing to permit them to supply electrical fittings and apparatus. Of course, the insertion of the Bermondsey clause reduces the importance of the question of the free supply of fittings.

Protective Clauses against Electrolysis.

The proceedings before the Committee of the House of Lords presided over by Lord Glanusk might have been rather lively on Tuesday and Wednesday last week, but for the firm attitude taken by certain parties seriously affected by two of the Bills referred to the Committee, and for the judicious spirit displayed by their promoters. The Bills in question were those of the Exeter Corporation and the projectors of a system of tramways between Preston and other places in Lancashire. Among other things, the Exeter Corporation sought power to construct and work tramways in and beyond the city, and to use animal or mechanical power; and as the Directors of the Gas Company had good reason for suspecting injury to their pipes from the carrying out of the scheme, they promptly took steps to safeguard their property. Fortunately for all parties, they were able (as announced in our "Electric Lighting Memoranda" last week) to obtain the insertion in the Bill of a clause setting forth that the Corporation are to make "full compensation" to the Company for any "loss or damage which may occur to their mains, pipes, and apparatus by fusion or electrolytic action" caused by the exercise of any of the powers conferred by the Act. Consequently, when the Bill was under consideration on Tuesday, what had at one time threatened to be an obstacle to its smooth progress had been happily removed. The next day their Lordships had before them the Tramways Bill against which the Preston Gas Company had petitioned on the same grounds as their Exeter friends—in fact, they, so to speak, proceeded on similar lines. The promoters evidently saw that their wisest course was to deal with their adversary while he was in the way; for the Company's Engineer and Secretary (Mr. Henry Green) was in a position to tell the Committee such a "plain, unvarnished tale" about electrolytic action on his pipes, and to show them some samples which would make them open their eyes, that they agreed to the insertion of a clause framed in even more favourable terms than those granted in the Exeter case. The result was the passing of the Bill with little or no opposition. The action of these two Companies may be commended to the notice of others. Owners of gas undertakings are in lawful possession of the subsoil of the public thoroughfares; and they are assuredly entitled to have their property protected against injury from any dangerous element which new comers may bring near it. But they must bestir themselves to obtain that protection as soon as threatened.

The Protection of the Brighton Gas-Mains.

Mr. Joseph Cash points out that there was a slight error in the note on electrolysis published last week. He says: "The opposition of the Brighton and Hove Gas Company to the Hove and Worthing District Tramway Bill was on three points. (1) Whether the provisions of the Tramways Act, 1870, applied to the reconstruction of an existing horse tramway. (2) To prevent electric cables, &c., being laid in a narrow road in which the arterial mains for the supply of gas from the Portslade works to the Company's gasholder stations at Hove and Blackrock are laid. (3) To provide for compensation for damage in the event of fusion or electrolysis. The Committee passed clauses in favour of the Company on the two first points, but declined to give the protection asked for in the third point. The Company are therefore fully protected in the case of the towing-path, confirming the protection obtained in the opposition to the Brighton Corporation Bill of 1900."

Bradford Corporation Bill.

The Bradford Corporation have been frequently in Parliament of late sessions; and this year they have again promoted a Bill composed of several new powers affecting many departments. Two sections of the measure referred respectively to gas and water. The part dealing with gas authorizes the mutual purchase or sale of so much of the gas undertaking of the Shipley District Council as is within the city or the district, on terms and conditions to be agreed upon. The sale may be carried into effect by way of exchange, with a money payment to equalize the transaction. Additional lands and loans are also required by the department. This part of the Bill was unopposed; but not so certain clauses in the water section, the discussion of which consumed the best part of two sittings of Lord Brougham and Vaux's Committee last week. The construction of a new service reservoir at Hartshead Moor and the laying of pipes in the parish of Clifton were not objected to. But the proposal to construct a catchwater or conduit in the parish of Pinkley, on land belonging to Mr. T. E. Yorke, was strongly resisted by that gentleman. The suggested works were intended to supplement those carried out under the Acts of 1890 and 1892, and have relation to the Nidd scheme. In connection with these works, the Corporation had purchased the water on, and the right to carry their main conduit through, Mr. Yorke's estate. Now they asked for power to run two additional and smaller conduits through the estate, and to take wayleaves for the purpose. These conduits were required for conveying water for use in the cleaning of the settling chambers, screens, and so on. However, Mr. Yorke contended that the Corporation were seeking to obstruct water which was now the sole supply of farmers on his estate; while the Corporation urged that they were seeking to divert no more water than Parliament had already given to them. Another group of works (which were linked with those in which Mr. Yorke was interested) related to the Gouthwaite compensation area; and the Gouthwaite Reservoir Board opposed, on the ground that, in their view, the Corporation were proposing to deal with water which now belonged to them as compensation water. The Corporation denied the accuracy of this; asserting that all the water that Parliament had given to the opponents was that in the streams and rivers flowing down from the compensation area. The works proposed did not take any river water, but merely the water which was underground, and which had been bought from Mr. Yorke. It was this disputed water for the conveyance of which the two small conduits previously referred to were required; and it follows if the Corporation are entitled to the water, they should certainly have the means of carrying it wherever they can best utilize it. It was round these points the whole discussion circled. Mr. James Watson, Mr. W. Woodhead, and Mr. Charles Gott were the principal witnesses for the Corporation; and they denied that the compensation water or the interests of anyone would be injured by the construction of the works and the taking of this subterranean supply. But, on the other hand, the opponents regarded the proposals as an infringement of the spirit of the Acts of 1890 and 1892, and several witnesses were called to show that the water intended to be taken came from springs which were well defined and flowed to the Gouthwaite reservoir. The upshot was that the Committee declined to allow the opposed works.

Torquay Water Bill.

On Wednesday, the Earl of Camperdown's Committee had under consideration the Bill promoted by the Torquay Corporation for the increase of storage capacity in connection with their water undertaking. It was pointed out by Sir Ralph Littler that the most important opposition had been disposed of, and all that remained was that of outside Local Authorities, which was on clauses. Torquay was essentially a place in which it was desirable that there should be an ample supply of the purest water it was possible to obtain. In 1856, the Corporation provided a system of water-works upon the hills, where the water was without the slightest danger of pollution; and they now had a storage capacity of 297 million gallons. A few years ago, they decided to make sure that there should be no pollution; and they spent £70,000 in purchasing the freehold of the whole watershed, and removed from it any trace of habitations and everything else where there was the least risk of pollution. Torquay had increased in size, and it became necessary to have more storage. In 1899, and again in 1901, the Corporation found that they were very short indeed—on one occasion they were within ten days of the end of their supply. The consequence was that the Engineer advised new works; and the Corporation were now asking for an additional storage capacity of 200 million gallons. This would mean a total storage for 210 days, which would relieve them from any anxiety. With regard to the opposition, he said that outside the borough the Corporation charged 30 per cent. more for water, because it was more expensive to deliver it. The Corporation had had to stand a rate-in-aid; and now they ought to have some of the benefits. It was stated by the Town Clerk that the Council proposed to borrow £22,000 for the works, and to repay it over a period of sixty years. The Committee allowed the Bill to proceed; but minor alterations were made in the wording of some of the clauses, so as to protect the interests of the opponents.

LONDON AND NORTH-WESTERN RAILWAY BILL.

The Breaking-Up of Streets.

Last week a Committee of the House of Lords, presided over by the Earl of Camperdown, considered an Omnibus Bill promoted by the London and North-Western Railway Company. It contained a clause asking for power to lay mains, &c., for the supply of gas at Crewe; and the Corporation of Crewe objected to this. Sir Ralph Littler, K.C., on behalf of the promoters, said that the major portion of the inhabitants of Crewe depended upon the railway for a livelihood; and when the Company commenced to supply gas, they were the only persons there to do it. The Corporation of Crewe had obtained an Electric Lighting Order, and so they would obviously become competitors with the Company. The result was that it entirely changed the relations of the Company and the Corporation. If the Company wanted to break up a street, it could not be done without the consent of the Corporation; and therefore they wished to have power given them in the Bill. Mr. Banks, for the Corporation, said the three objects which his clients wished to attain were obligation to supply, a reasonable price, and a reasonable quality. The Railway Company were not bound to supply gas; nor were they bound to supply it at a reasonable price and of a reasonable quality. Under these circumstances, the Corporation did not want the Company to have the power of breaking up the streets. Sir Ralph Littler said the Company supplied to everyone outside their works at 2s. 9d. per 1000 cubic feet for lighting, and 2s. 6d. for cooking. Evidence was called to show that since the Corporation obtained powers to supply electricity, the Company had to a large extent ceased to furnish gas for the purposes of street lighting. It was also stated that two-thirds of the gas was used by the Company for their own purposes. There were over 27 miles of mains in the streets. Witnesses for the promoters admitted that the Company had all this time been liable to be indicted for breaking up the streets. Mr. Corbet Woodall, on behalf of the Corporation, said he had never heard of such an application as that made by the Railway Company for power to break up streets. Mr. Honoratus Lloyd, in reply to the Chairman, said there was no such thing as a company supplying gas by agreement having power to break up streets. Mr. Woodall also said this power had never been given to any but statutory companies, and only then together with the usual obligations. Mr. Lloyd remarked that he was unable to make comparisons, because this was a unique case, in that it was an ordinary Company seeking the powers of a statutory company without the obligations of such a company. Mr. Banks pointed out that if the Bill went through the Company would be enabled to supply if they wished, what they wished, and at what price they wished. Up to the present time, when complaints arose they were in a position to bring them properly before the Company on behalf of the town; but now the Corporation were in a position to say: "Well, if you will not deal with the thing reasonably, we will not allow you to break up the streets." He asked what reason there was for giving the Company what no other non-statutory company in the

United Kingdom possessed. Sir Ralph Littler argued that if the Company were not given this power, the Corporation could indict them for creating a nuisance when dealing with gas-mains; and if the Company were fined, it would mean that they would be prevented from opening the streets in future. The Chairman: Is it true that this power which you ask for has not been given to any non-statutory company? Sir Ralph Littler: So far as I know, that is so, because our whole position is unique. The Chairman said the Committee had decided that it was not expedient to give the power sought to the London and North-Western Railway Company. The Bill was then allowed to proceed.

DERBY GAS BILL.

The Bill for consolidating the capital of the Derby Gas Company, or enabling them to raise additional capital, and for other purposes, came last Thursday before the Committee on Unopposed Bills in the House of Lords, presided over by the Earl of Morley, the Chairman of Committees. The preamble of the Bill having been proved by Mr. Godfrey Mosley, the Agent for the Bill, replying to the Lord Chairman with reference to a provision sought to be placed by the promoters in the clause dealing with the quality and testing of the gas, said it only referred to the amount of sulphur to be permitted. Under the Derby Gas Act of 1890, 20 grains of sulphur per 100 cubic feet were allowed; and by the present provision, the Company would be liable to a penalty if the amount of sulphur per 100 cubic feet were found to exceed by more than 5 grains the limit of 20 grains. The only precedent he could quote was that of the Crystal Palace Gas Bill now in Parliament. The provision simply dealt with sulphur compounds, and not with sulphuretted hydrogen. Mr. J. Ferguson Bell, the Engineer to the Company, was called, and said that 20 grains was not a large amount of sulphur per 100 cubic feet. In London, 22 grains were allowed in winter; and in some cases the sulphur reached 25 or 30 grains per 100 cubic feet. The Lord Chairman said he should like to consider this point together with the provision contained in the Crystal Palace District Gas Bill; and the report of the Bill was accordingly adjourned.

ELECTRIC LIGHTING IN WILLESDEN.

Last Friday, a Committee of the House of Lords, presided over by Lord Brougham and Vaux, had before them the Bill promoted by the Willesden Urban District Council, which contains clauses relating to electric lighting. In respect of these, a petition was presented by the Gaslight and Coke Company, who light the district by gas; and Mr. Balfour Browne, K.C., and Mr. Frere appeared in support of it. Mr. Balfour Browne asked the Committee to give the Company the same protection that Parliament had given to the South Metropolitan Company in the case of the electrical undertakings of the Local Authorities of Bermondsey and Woolwich. He said the Council sought powers to erect a large generating station from which to supply adjoining Local Authorities who were themselves authorized to supply energy, and, further, to supply any local authority, company, or person owning or working any tramway, tramroad, railway, or light railway, partly within and partly beyond the district. There were very considerable questionings as to the extent to which local authorities should go in municipal trading, and he thought the idea of Parliament was that this trading had been allowed to go too far. At any rate, now that they had the opportunity, he asked their Lordships not to allow the promoters to go any further without giving the Company protection against any probable loss arising from the working of their electricity supply undertaking. It seemed to him an absolutely monstrous thing that this Local Authority should steal the customers the Company had in the district, and that, if there was any loss, it should be borne by the general body of ratepayers, among whom the Company was one of the largest—paying more than £2000 a year in rates. If municipalities were to trade they should trade fairly. He should therefore ask the Committee to say: (1) That the Council should not be allowed to supply energy to local authorities outside their own district; (2) that they should be prevented from supplying electrical energy to tramways outside their own area; (3) that, if they were allowed to supply electrical fittings at all, they should be put under an obligation not to supply them free; and (4) that a clause should be inserted in the Bill, similar to the South Metropolitan Gas Company's clause, providing that the Council should, once every year after the first year's working, cause to be laid before them a statement and balance-sheet of the accounts of the electrical undertaking, and should thereupon fix annually the charges to be made for the supply of energy in the ensuing year at such rate that the revenue for the year should not be less than the expenditure. His object was to secure that the expenditure should be met out of the revenue of each year, and not be made a burden on the rates. The Committee having consulted in private, the Chairman said they were of opinion that the Council should not supply electrical energy outside their own boundaries; that the clause as to the supply of electrical fittings should remain as it was in the Bill; and that a clause should be inserted similar to the one in the Bermondsey Bill, providing for an annual balance-sheet and statement of accounts.

Some conversation took place at the last monthly meeting of the Chesterfield Rural District Council with regard to traces of lead which have recently been found in samples of water taken at Unstone. One of the members maintained that the present method of treating the water with chalk "and other things" was less satisfactory than would be the adoption of tin-lined iron service-pipes. It was decided to hold a special meeting of the Northern Water Committee to consider the question, and to treat with chalk the 20 million gallons of water in the reservoir complained of.

MISCELLANEOUS NEWS.

WELSBACH CAPITAL REORGANIZATION.

The proprietors of the Welsbach Incandescent Gaslight Company, Limited, having (as recently reported) approved the scheme for the reorganization of the capital proposed by the Board and the Advisory Committee, separate meetings of the three classes of proprietors—the preference, ordinary, and deferred—and a combined meeting of all proprietors were convened for last Wednesday at Winchester House. It was proposed at the separate meetings to submit resolutions ratifying and approving provisional agreements made between the Company and Mr. T. J. Brinsmead (acting for the preference stockholders), Mr. W. W. Wright (acting for the ordinary stockholders), and Mr. Lawrence Fletcher (acting for the deferred shareholders), providing for the modifications in the rights of the respective stockholders and shareholders necessary to give effect to the scheme, with certain alterations since made therein.

In the circular to the deferred shareholders, the Board said they regretted that it had been found absolutely impossible to offer the deferred shareholders more favourable terms in the reorganization. The deferred shareholders, however, must remember that there were at present debenture stock for £110,000, preference stock for £1,500,000, and ordinary stock for £1,350,000, all ranking in priority to the deferred shares, and cumulative as to dividend, and that, in respect of arrears of dividend, no less a sum than £569,250 had accumulated against the deferred shareholders on March 31 last. The Board considered it certain that these arrears must, unless the reorganization of the capital was carried out, continue to grow, and that, apart from this reorganization, there was no possibility of the deferred shareholders ever receiving any dividend, however small, upon their shares. The deferred shareholders must, it was pointed out, further remember that the Company had sustained a capital loss and depreciation of over £2,000,000, which the Company had decided must be written off, and that, in the absence of some concession by the preference and ordinary stockholders, this great loss fell to be met in the first instance by the deferred shareholders; and, as their shares amounted to £629,000 only, it was obvious that the whole of their capital was lost. It was added that, while the Board were anxious to have the co-operation of the deferred shareholders and to preserve to them some interest in the Company, they must not lose sight of the fact that the preference and ordinary stockholders together controlled the voting power of the Company, and that it was in their power to propose and carry (subject to the sanction of the Court) a scheme of reorganization which, proceeding on the strict rights of the three classes of holders, would cancel the whole of the deferred shares, and leave them no interest whatever. As appeared from the terms of the notice sent with the circular, it was intended, if the resolutions were not passed by the requisite majority at the meeting of the deferred shareholders, to submit the resolutions to the extraordinary meeting of the Company framed so that the deferred shares should be extinguished altogether.

The meetings were accordingly held; but they all had to be adjourned for a week owing to the necessary condition that the holders of the respective classes of stock and shares to the extent of at least two-thirds should be present, either in person or by proxy, not being fulfilled. Mr. Edgar Williamson was at his post as Chairman; and was supported by all the Directors and various members of the Advisory Committee. Considering the importance of the occasion, the meeting was sparsely attended; but this was easily explained when the extent of the support the Directors had received in the way of proxies was learnt.

At the meeting of the preference stockholders, the Chairman intimated that it was necessary to have present, in person or represented by proxy, members holding £1,000,000 of preference stock. The Board had received proxies to the total amount of £933,958. This was made up as follows: In favour of two shareholders, were proxies for £8450, but, of course, it was not known which way they would vote; in favour of the United States Debenture Corporation, £30,650; and in favour of the Board and Advisory Committee, £894,858. There were members in the room who had not sent in their proxies; and these made the total amount represented at the meeting or by proxy, £943,398. They only wanted about £50,000 more stock to enable them to proceed to the business; and if they did not get this, it would be necessary to adjourn. He also mentioned that Mr. Lock, of the United States Debenture Corporation, had received a certain number of proxies, which he said he did not intend to use that day, but he proposed to retain them for use in Court if necessary. Mr. Lock further declared that his object in not lodging them was to prevent the obtaining of a quorum. This statement was greeted with cries of "shame." The Hon. Philip Stanhope addressed the meeting for the purpose of drawing public attention to the action taken by a small minority in order to defeat what was manifestly the desire of the great majority of shareholders in the Company. This action was being taken by the United States Debenture Corporation—at least, he presumed it was, because a circular which had been sent to him (Mr. Stanhope) and everybody else said that, if they were not satisfied with the policy of the Board, they should send their proxies to the Right Hon. Sir Mountstuart E. Grant Duff, or failing him Mr. Benson or Mr. Charles Lock. Mr. Lock would excuse him saying that he was an official of the Debenture Corporation. Was it not, asked Mr. Stanhope, a fact that the Companies of both the latter gentlemen were associated with the promoters' Syndicate at the time of the formation of the Company; and was it not a fact that, far from having, as did the great majority of the unfortunate proprietors in the Company, bought or applied for their shares in the ordinary way, they only acquired them as members of the promoters' Syndicate. Then Mr. Benson rose and disassociated himself from the statement that he or those acting with him, or the Merchants Trust, were in any way connected with the promotion of the Company. He admitted that they subscribed through a firm

for £10,000 of stock, and afterwards brought £10,000 more. He had abundant admiration for the present Board's management of the Company; but he had an objection to the proposed scheme. It was unique in the matter of the extent to which it disregarded existing priorities. He went on to argue the point as to the Directors' refusal to take the responsibility of paying out dividends from accumulated funds until the depreciation of the capital was reduced. It was on these points that he joined issue with the Board. Colonel Bethell opposed the scheme; and then Mr. Lock also disclaimed the suggestion that his Company were in any way connected with the promotion of the Company. They held £10,350 of preference stock, which they took at the inception of the Company. He did not think that it constituted a man a promoter because he underwrote stock. It might be interesting to the proprietors to know that Mr. Stanhope held £4000 of preference and £15,000 of ordinary stock. Mr. Stanhope interjected "and £1000 of deferred stock—making £20,000 altogether." It was pointed out by Mr. F. Walker that no one was suggesting that Mr. Lock was not entitled to vote in respect of his fairly substantial holding; but what they did protest against was his attempt to make the meeting abortive, and to throw on to an immense majority of the Company the burden and necessity of attending another meeting. The proxies Mr. Lock had obtained were so insignificant that he had not attempted to lodge them with the officers of the Company. However much trouble he might give the Directors, and however much expense he might throw on the proprietors, Mr. Lock's tactics would not prove successful.

All this and much more that was said was, of course, informal; but this abbreviated account of what took place is given to show the directions from which came the obstruction to the prompt passing of the scheme. Colonel Mundy and others—two of them shareholders in the United States Debenture Corporation—appealed to Mr. Lock not to withhold the small amount of proxies then required for the holding of the meeting; but he was obdurate, having apparently some fear that his position, in the event of an appeal to the Courts, would be prejudiced. Further explanations followed; and then the Chairman intimated that stock to the amount of £984,582 was represented at the meeting or by proxy; and that only £15,500 more was required to get the quorum. However, eventually the Chairman declared the meeting adjourned for a week; and he hopefully stated that it was perfectly clear that by then they would have the necessary quorum.

At the time for the meeting of the ordinary shareholders, the Chairman announced that they required for a quorum a representation, either in person or by proxy, of £900,000. They had £864,219, nearly the whole of which was in favour of the proposals of the Board. After waiting the necessary half hour, the meeting was also adjourned. The meeting of the deferred shareholders met with a like fate. The representation needed, in person or by proxy, was 419,693 shares, and there were only 304,111. The Chairman earnestly appealed to the deferred shareholders, if they did not wish to be entirely wiped out, to support the Board by forming a quorum at the adjourned meeting. The Board, he said, were very desirous of being in a position to preserve in the scheme the interests of those deferred shareholders who had sent in their proxies.

The meetings thus all stand adjourned until to-morrow, when it is hoped that better fortune will wait on the scheme.

THE LONDON COUNTY COUNCIL AND THE GASLIGHT AND COKE COMPANY.

The Recent Settlement.

The following is the report which the Parliamentary Committee of the London County Council presented last Tuesday, as mentioned in the "JOURNAL" that day, setting forth the terms of settlement with the Gaslight and Coke Company:—

As the result of prolonged negotiations between representatives of the Council and of the Gaslight and Coke Company, important amendments have been secured in the Company's Bill, which has now been passed by a Select Committee of the House of Commons; and the Gaslight and Coke Company's Acts Amendment Bill, promoted by the Council, has been withdrawn. The amendments denote a considerable alteration in the attitude hitherto taken up by the Company, and secure to a large extent the objects which the Council had in view in promoting its Bill—namely, to carry out the recommendations of Sir James Rankin's Committee of 1899, and to give effect to the conclusions arrived at by the conference of Local Authorities convened by the Council, and held at the County Hall on March 7, 1902. We append particulars of the amendments, and it may be well to shortly inform the Council as to the various stages of the action taken with regard to the Bills.

In accordance with the authority given to us by the Council, a petition was presented against the Company's Bill; and a petition was presented against the Council's Bill by the Company. With a view to enabling the whole case to be fully considered by a Select Committee, both the Bills were, by arrangement, read a second time without discussion in the House of Commons on the 17th of March. On the suggestion of the Company, an informal conference took place between representatives of the Council and the Company, for the purpose of discussing the points at issue, with a view, if possible, of arriving at some agreement on the questions to be submitted to the decision of the Select Committee on the Bills. This formed the prelude to negotiations which resulted in the drawing up of a list of heads of suggestions on which a settlement might be based.

With regard to the proposal in the Council's Bill to reduce the standard of illuminating power of the Company's gas to 14 candles, it was agreed that, in view of the appointment by the Board of Trade of a Departmental Committee to deal with the question of gas testing, the proposal to reduce the illuminating standard should be withdrawn. In reference to the proposed reduction of the Company's standard price to 3s. 3d., the Company pointed out that they made no charge for meters, as did the Commercial and South Metropolitan Gas Companies; and that, in comparing their position with that of the other Companies, so far as concerns standard price, regard had to be paid to this fact. They stated that they considered the non-charge of meter-rents to be equivalent to about 1d. per 1000 cubic feet off the price of gas; and they did not see their way to definitely surrender their power of charging meter-rents while the other Companies retained that power. They were, however, prepared to state that they had no intention of re-imposing meter-rents in the case of ordinary consumers. It was ultimately agreed a statement to this effect should be made by Counsel for the Company before the Select Committee; and on this understanding a definite settlement was arrived at.

It will, perhaps, be desirable to set out shortly the proposals of the two Bills as introduced, together with the provisions of the Company's Bill as they now stand as the result of the settlement; and for greater convenience we append the particulars in tabular form:—

Proposals in the Council's Bill.	Proposals in Company's Bill as Introduced.	Proposals in Company's Bill as Amended.
	(a) Standard Price.	
To reduce the Company's existing standard price for gas of 16-candle power from 3s. 9d. per 1000 cubic feet to 3s. 3d. [to be further reduced to 3s. 1d. for 14-candle gas], and to provide that the dividend on the Company's ordinary stock may be increased above or reduced below 4 per cent. by 2s. 8d. per cent. for each 1d. by which the selling price respectively falls below or exceeds the standard price.	To reduce the existing standard price from 3s. 9d. to 3s. 6d., and to provide that the dividend may be increased above or reduced below 4 per cent. by 2s. 8d. per cent. as proposed in the Council's Bill.	To reduce the standard price to 3s. 4d. [An arrangement was also come to as to the continuance of the Company's practice of not charging meter-rents and a statement on the subject was made to the Select Committee as set out below. The sliding-scale of dividend remains as originally in the Bill.]
	(b) Illuminating Power.	
To reduce the standard of illuminating power of gas supplied by the Company from 16 to 14 candles, and at the same time to correspondingly reduce the standard price from 3s. 3d. to 3s. 1d. per 1000 cubic feet.	—	—
	(c) New Capital.	
—	To create and issue debenture stock not exceeding £1,000,000.	To create and issue debenture stock not exceeding £750,000.
	(d) Redemption Fund.	
To provide that one-half of the Company's clear profits (if any), after paying a dividend of 4 per cent. per annum (equal to 10 per cent. on the capital prior to conversion), shall be carried to a fund to be applied to the redemption of obsolete capital.	To provide that one-fourth of the Company's clear profits (if any), after paying the standard dividend (4 per cent.), shall be set aside to form a redemption fund.	To provide that when the authorized rate of dividend exceeds £4 per cent. the following sums shall be carried to a redemption fund: When the dividend exceeds £4 per cent., and is less than £4 8s. per cent., £10,000; when it is between £4 8s. per cent. and £4 16s. per cent., £20,000; when it is between £4 16s. per cent. and £5 4s. per cent., £30,000; and when it exceeds £5 4s. per cent., £40,000. The Company shall not be bound to carry any money to the fund so as to reduce the dividend on the total amount of ordinary stock below £4 per cent. This provision to cease to operate when £1,000,000 of ordinary stock has been extinguished.

The Bills came before a Select Committee of the House of Commons, presided over by Sir Robert Gunter, on the 12th of May. Counsel appeared before the Committee on behalf of the Council, and stated the terms agreed with the Company, on the approval of which by the Select Committee the Council's Bill was to be withdrawn. With regard to the question of meter-rents, Counsel for the Council stated that the Company had agreed that the following statement should be made on their behalf: "The policy of this Company is not to charge meter-rents, and the Directors have no intention of re-imposing the charge in the case of ordinary consumers. But they object to the power of making the charge being taken from them while it is both retained and exercised by the other Metropolitan Gas Companies." This was assented to, and the statement was adopted by Counsel on behalf of the Company. Leave was then given by the Committee for the withdrawal of the Council's Bill. In consequence, however, of the withdrawal of this Bill, a question arose as to the power of the Council to defray the expenses connected with its promotion. The Bill had included a provision on this point, but that, of course, dropped with the Bill. Ultimately, with the permission of the Select Committee and the consent of the Company, a clause was inserted in the Bill of the latter which will confer upon the Council the necessary power.

We desire to point out that, in arriving at the settlement as above stated, we have obviated what would probably have been a long and costly contest before the Select Committee; and we recommend—"That the course taken be approved."

The report was adopted.

GAS AFFAIRS AT MANCHESTER.

Abolition of Cooker-Rents—Reduction in Price—The Collection of Accounts.

An Adjourned Meeting of the Manchester City Council was held last Wednesday—under the presidency of the LORD MAYOR (Mr. John Royle)—at which various questions relating to the Gas Department were discussed.

Alderman GIBSON, the Chairman of the Gas Committee, first of all moved a resolution abolishing the charge which has hitherto been made for the hire of gas-cooking stoves. This, he said, would mean a loss of something like £7000 a year; but the Committee hoped to be recouped somewhat by the increased consumption of gas which in all probability would follow from the free use of gas cooking-stoves. Experience showed that the possessor of a gas-cooker consumed about 30 per cent. more gas than he did when he had no such cooker. The Manchester Corporation had been behind some other municipalities in regard to the number of cookers in proportion to the number of gas consumers, for whereas Leicester, which charged only a nominal sum for the hire of cooking-stoves, had 30,000 cookers among 70,000 consumers, Manchester had only 13,700 cookers among 100,000 consumers. In Manchester, the prospect of the discontinuance of the charge for the hire of gas cooking-stoves had already stimulated the demand for gas to an enormous degree. Within the three weeks preceding the Committee's announcement respecting the proposed abolition, there were 205 applications for cookers; but in the three weeks that had passed since the announcement, the number of applications had risen to 462. Hence it was hoped that the policy now recommended by the Committee would lead to a great increase in the consumption of gas, especially during the summer months. With the adoption of these cookers, many householders would discard the use of coal-fires during the summer months, and in this way add to the clearness and purity of the atmosphere. The Committee were not thinking of legislating retrospectively; nor would they allow applicants to choose what manner of stove they would have. The Committee must be the judges. As to the stoves now in use which had been bought outright by the consumers, the Committee would reserve to themselves the right either to buy back or refuse to do so. If they did buy any back, it would only be those that they could make as good as new.

This resolution having been carried,

Alderman GIBSON next moved that, as from June 24 next, the price of gas to ordinary consumers only be reduced by 3d. per 1000 cubic feet—viz., from 2s. 9d. to 2s. 6d. within the city, and from 3s. to 2s. 9d. outside. This meant giving to the gas consumers £45,000 a year. Two years ago, 1d. per 1000 cubic feet of gas was equal to about £12,000 a year; to-day, in consequence of the satisfactory increase in the undertaking, it was equal to £18,000, so that 3d. per 1000 feet meant a reduction of £54,000.

Alderman BRIGGS seconded the resolution.

Alderman MAINWARING called the attention of the Council to the extraordinary generosity of the Gas Committee in indirectly reducing the rates of the city. He wanted the Chairman of the Committee to understand that his criticisms were entirely of a friendly character, and in no way in opposition to his proposal. He merely wished to point out that the Gas Committee had for a number of years indirectly borne the increased expenditure from the rates to a larger extent than they should have been called upon to do. At the present time there were 100,000 ordinary gas consumers. Of this number, 42,000 were what were called prepayment consumers; and in the interest of this class he asked the Council if at some future time they would consider the advisability of reducing the price of gas to an extent that would not involve a burden upon the consumers. Two years ago the Chairman of the Gas Committee asked the Council to permit the Committee to reduce the price of gas 3d. per 1000 cubic feet. It was pointed out that the rates of the city were advancing, and that the time was inopportune for any reduction to be made. The recommendation was taken back; and one would have thought that the various Committees would have carefully considered their estimates for the following year. They found, however, that, instead of exercising vigilance and care, the expenditure of the city was increasing by leaps and bounds; and the Council came to the Gas Committee in order to relieve themselves of the increasing burden upon the ratepayers. Ten years ago, the Water Committee obtained an Act of Parliament compelling the Gas Committee to pay over half their profits in order that the former Committee could remain in practically what might be termed a solvent condition. To the water-works the Gas Committee had contributed no less than £160,000; and it would be found that since the Gas Committee began to hand over to various Committees profits in relief of the rates of the city, the sum so handed over amounted to £2,509,000. This, he held, was money taken out of the pockets of the gas consumers. To-day the value of the gas-works was less than the sum contributed in relief of the rates. This was not fair to gas consumers; and they had a right to claim that the commodity they used should be reduced in price.

Mr. BROCKLEHURST said he was glad the reduction had taken place. It was recommended for the ordinary consumer. He wanted to say a word for those who might be described as extraordinary consumers. A short time ago, the price was reduced to 2s. per 1000 cubic feet to users of gas-engines. He would be glad if the Committee would take into consideration the advisability of reducing the price all round for trade purposes. He did not, for instance, see the vital difference between the man who used gas for baking his bread and the one who employed it for driving an engine; they were both "trade purposes." He also, on behalf of the penny-in-the-slot consumers, asked that two brackets should be provided instead of one as at present.

Alderman GIBSON replied that no one was more desirous of bringing about a reduction in the price of gas used for all trade purposes than he was; and had it been possible, it would have been done. It was, however, a very difficult matter to draw a line as to what were trade purposes. With regard to the penny-in-the-slot consumers, he had given instructions that if they desired two brackets they were to be provided.

The resolution was then agreed to.

Alderman COPELAND, in moving the adoption of the Finance Committee's report, dealt at length with the expenditure of the city, and in the course of his remarks said that since the report had been printed the Chairman of the Gas Committee had consulted his colleagues with respect to a further contribution in relief of the rates.

Alderman GIBSON, in seconding the motion, remarked that when he heard the rates of the city were likely to be raised 1½d. in the pound, he thought, considering that the Gas Committee were in a very favourable position, it might be possible to relieve the ratepayers of the proposed increase. It was at first suggested that the Tramways Committee and the Gas Committee should each give an additional £10,000; but the Chairman of the first-named Committee did not see his way to adopt this arrangement. The Gas Committee, therefore, had agreed to contribute the whole of the £20,000 required for the purpose—making the total amount of their contribution for the relief of the rates in the current year £70,000. With the rates remaining the same as last year, and with a reduction of 3d. per 1000 cubic feet in the price of gas, the ratepayers would be much better off than last year.

The various estimates were then taken separately and approved.

Mr. PLUMMER then moved the adoption of the report of the Special Committee *re* Collection of Rents, Rates, &c. He said they were spending at present between £12,500 and £13,000 a year in the collection of their various rents and rates, apart from the cost of collection of rates by the Overseers. The Committee, after going carefully into the subject, had formulated two recommendations—(1) To authorize the Gas Committee to make an allowance of 3d. per 1000 cubic feet on all accounts paid within thirty days of the delivery of the demand note; and (2) that the Council should apply for powers in the next General Bill in Parliament to impose a penalty for non-payment of gas, water, and electricity rents or rates within a given period. The penalty system was in use in Glasgow with distinct success. It cost them in Manchester 24s. per £100 to collect these rents and rates; while in Glasgow the same effect was produced on an outlay of 10s. 2¼d., and with possibly less friction than was experienced under the present Manchester method of collecting. It was not meant by the Committee to inflict any injustice upon any servants of the Corporation now engaged in the collection. It might be in accordance with economic laws that combines should discard old servants; but the Corporation would not be advised to follow this course. Lapse of time and the ordinary laws of Nature might be left to bring about the reduction of the staff in the event of the proposed changes being made.

Mr. J. SIMPSON seconded the motion. He said that the cost of collection was now 1¼ per cent., notwithstanding that many consumers sent their accounts by cheque or took the money to the offices. On one particular day, he was informed, over 3000 people called at the gas office to pay accounts after being threatened.

Alderman GIBSON moved, as an amendment, that the report be approved except so far as it related to the gas undertaking, and that the consideration of such excepted part be adjourned *sine die*. Mr. Plummer, he said, had made an unfortunate selection in the case of Glasgow for comparison. While the Glasgow Gas Department had made a profit of only £40,000 in the last twenty years, the Manchester Gas Department had in the same time made a profit of £1,000,000, which had mainly gone in relief of the rates. The Glasgow gas accounts were collected only three times a year; while in Manchester they were collected quarterly.

Mr. PLUMMER remarked that he did not hold up the Glasgow Gas Department as a model.

Alderman GIBSON said he was concerned only with the Gas Department in this discussion. In Manchester, they collected the whole of the gas and electricity accounts, amounting in round figures to £700,000 a year, for £9600. This included the salaries of the collectors and of the men at the counters who received accounts, and also the salary of the Head Cashier of the department. Further, they collected £99 16s. 8d. out of every £100 due. This was a splendid record; and it was done without a penalty clause. As to the proposal of a discount for prompt payment, he need only point out that about £130,000 was now paid during the first months of the four quarters of the year. This meant the price of 739 million feet of gas; and a reduction of 3d. per 1000 feet on that quantity would be £10,000. The discount would perhaps lead to three times the present amount being paid during the first months of the quarters; and they would thus be paying £30,000 a year for what now cost them £9600. Where were they going to get £50,000 a year profit in that case? The discount would, of course, go not to the heavily-burdened people, but to the richer consumers, who were always ready to pay their accounts in order to receive it. The proposal was iniquitous and unwise; and the Council ought not to sanction the interference suggested with the management of a department which was already managed by people who understood it.

After some further discussion, Alderman Gibson's amendment was carried; and a second amendment was agreed to, that a copy of the Special Committee's report should be forwarded to the Gas, Water, and Electricity Committees for their observations on recommendation (2). This was not put as the substantive motion; but it was understood that would be done at the next meeting of the Council.

South African Lighting Association, Limited.—The Directors' report for the year ended the 31st of December last sets forth that during that period the business of the Association at Port Elizabeth and Grahamstown again showed a marked increase. The Directors express their entire satisfaction with the manner in which the staff in South Africa have performed their duties under circumstances of peculiar difficulty. The balance of the profit and loss account, including the amount brought forward from 1901, after payment of debenture interest and income-tax, is £10,178. An interim dividend was paid in October; and the Directors have appropriated to reserve £1500. They recommend a final distribution of 6 per cent. (making 10 per cent. for the year), free of income-tax; leaving a balance of £2616 to be carried forward.

BIRMINGHAM CORPORATION GAS, WATER, AND ELECTRICITY SUPPLIES.

Consideration of the Annual Reports.

At the Meeting of the Birmingham City Council last Tuesday, the reports of the Gas, Water, and Electricity Committees were presented. The gas and water accounts were noticed in the "JOURNAL" for the 12th inst. (p. 391).

GAS COMMITTEE.

Mr. BISHOP submitted the report of the Gas Committee, and moved that the sum of £56,920, the net surplus for the year ending March 31, be carried to the credit of the improvement rate. He said it was probably the last time that such a resolution would be submitted, though he hoped it would not be the last time they would make such a profit. They had discovered the resolution to be unnecessary, inasmuch as the Council had no power over the balance at the close of the year's accounts. It must by law go to the improvement rate; and this would be the automatic result as soon as the report embodying the accounts was approved. Referring to the year's accounts, he called attention to the circumstance that the price of coal, which was the cause of an increase of 3d. in the price of gas from September, 1900, had to some extent fallen; and this reduction had enabled the Committee to present the very satisfactory financial statement now submitted, in spite of not inconsiderable difficulties. During the year, £64,930 of new capital expenditure had been incurred, chiefly in the extension of buildings and manufacturing plant. The revenue account showed that the total expenditure for the year amounted to £707,318, or £7770 less than in the previous year; while the income was £885,925, or £26,356 more. The gross profit on the year under review was thus £178,606, as against £144,481—an addition in favour of the year just closed of no less than £34,125. On the debtor side of the account, it would be observed that heavier expenditures had been necessary for the repair and maintenance of works and plant, as a result of the postponement of all avoidable expenditure in the two previous years, so as not to necessitate the raising of the price of gas more than 3d. per 1000 cubic feet. It was obvious, however, that there was a limit beyond which such outlay could not be postponed without seriously depreciating the plant, and he had now pleasure in assuring the Council that during the last year the works and plant had been fully repaired and maintained. This accounted for an increase in the item under consideration of something like £41,000. On the credit side, it would be noticed that the income from the sale of gas was £18,874 greater than in 1902, due to a growth in the consumption of 3¼ per cent. The average price charged during the year was 2s. 3·62d. per 1000 cubic feet, as against 2s. 3·84d. in 1902; and the quantity of coal used in manufacture was 537,389 tons, in addition to which nearly 3,000,000 gallons of oil were employed, or equivalent to a further 100,000 tons of coal. It would be seen, therefore, that if the Committee had not adopted the carburetted water-gas system of manufacture, the quantity of coal that would have been required would have reached a total of 650,000 tons. Residual products had yielded £8400 more than last year. They received £2000 more from the coke, slightly less from tar, but between £6000 and £7000 more from ammoniacal liquor. The price of ammoniacal liquor was regulated by the value of sulphate of ammonia, which during the past year had been largely in demand. As he had already stated, the result of the working was a gross profit of £178,606. From this there were to be deducted the charges for annuities and interest, amounting to £86,512, and sinking fund £35,187; and taking an income of £14 from Consols into account, it left an available balance of £56,920, which, on the approval of the report by the Council, would be handed over to the Finance Committee to be placed to the credit of the improvement rate. It must, however, be understood that this was not the only sum contributed to public purposes out of the revenues of the Gas Department. A direct payment was made to the improvement rate of £4000, which had been received as interest on the reserve fund; and by charging a much reduced price for gas for public lighting, a further sum of £15,400 was contributed last year in aid of the rates. The reduced charges for public lighting also relieved the rates of the suburban authorities last year to the extent of over £4600. He mentioned this circumstance particularly for the reason that, before the House of Lords Committee recently, Counsel for an opponent of the Corporation Bill asked him if he was not aware that they were paying more for gas outside the city than the inhabitants inside. He replied that he knew nothing of the kind, since the fact was that they paid exactly the same; and he added that during the time the local authorities had had the advantage of a reduced price for public lighting, they had benefited to the extent of £60,000. The present position of the coal market would appear to indicate that the prices they would have to pay during the contract year commencing July 1 next would approximate those of the year 1899-1900, in which event a substantial reduction in the price of gas would be recommended in the report which the Committee would bring up immediately after the contracts had been placed.

The resolution having been seconded and carried,

Mr. BISHOP moved the adoption of the Committee's report.

Alderman MANTON, while congratulating the Committee upon their trading success, thought there was one blot upon it, and that was the excessive price charged for gas. He urged the Committee to give an hour's calm consideration to the claim of the consumers to a large part of the profit which had been made.

Mr. TONKS did not consider that an excessive profit had been made; and he did not see why a reduced price should be charged to the outside authorities for court and public lighting. When the question of reducing the price was considered, he hoped the Committee would recognize the desirability of a reduction in gas used for power—especially in view of the probable competition of Mond gas.

Mr. WHITTALL thought the general public would appreciate a reduction in the rates more than a reduction in the price of gas. He hoped the Committee would make as much profit as they could, especially as the price of gas at the present time was not excessive.

Mr. STEVENS pointed out that the price of gas was 9d. per 1000 cubic feet lower than in 1875, when the Corporation took over the supply, notwithstanding that coal was now much dearer. It must also be remembered that a reduction of a penny meant something like £25,000, and that a number of ratepayers used oil.

Mr. FREEMAN sympathized to some extent with the view expressed by Alderman Manton. After a certain amount of profit had been made, the advantage ought to go to the consumers in the shape of reduced charges. He thought the fact that a number of inhabitants were not consumers was an argument in favour of Alderman Manton's contention. He wished the Chairman of the Committee had told them more about the quality of the gas; and he hoped that in making their contracts, they would arrange to buy more coal of a better kind.

Alderman BAKER said this was the usual battle between the gas consumer and the ratepayer. Would it not be possible to avoid its recurrence by laying down a percentage of profit to be taken by the Corporation, and dispose of any margin by a reduction of charges?

Alderman CLAYTON pointed out, in reply to Mr. Tonks, that the Committee were bound by law to charge the outside consumers exactly what was charged to consumers inside the city. He also reminded the Council that it was the ratepayers of Birmingham who had to bear the risks of the undertaking; and they were entitled to have their interests protected.

Mr. BISHOP, in reply, said that when the gas-works were purchased, it was intended that they should yield a profit in relief of the rates. At the same time, the Committee always endeavoured to hold the balance fairly as between the ratepayers and the consumers. The latter certainly had enjoyed their share of the advantages attendant upon municipalization. The question of gas supplied for power purposes was constantly before the Committee. Replying to a question, he said that gas for public lighting was supplied by meter at 1s. 1d. per 1000 cubic feet, as compared with 2s. 3d. charged to the general public. The proportion of gas used in the city was 75 per cent. of the whole amount.

The report was approved.

WATER COMMITTEE.

Alderman LAWLEY PARKER, in moving the adoption of the Water Committee's report, stated that the capital expenditure on the Elan scheme during the past year had been £458,300, making a total of £4,903,966, and leaving something less than £1,000,000 to spend to complete the work in accordance with the terms of the Committee's report of March, 1902. He could not, of course, speak with any certainty; but he saw no present evidence that the amount would be exceeded. Passing to the revenue account, he said it would be seen that the rents had increased £4515; but the Committee thought this rather disappointing. It was an increase of only 1·79 per cent., against 4·36 per cent. in the previous year, though the latter was greater because of the additional charges secured by a reassessment of a portion of the area. The standard increase on which they had estimated was 3 per cent.; and the average during the past ten years had considerably exceeded this amount. The domestic supply had increased by 3·28 per cent.; the falling off having been in the commercial supplies, which had been actually 0·89 per cent. less than in the previous year. Something of this was due to the broken weather, which had prevented the necessity for street watering; but the larger amount, he was afraid, was due to a falling off in trade. The gross profits of the year were £6932; and the Water Committee had hoped to see this amount larger—something like £10,000, if a 3 per cent. increase had been realized. The Water Committee had formed an estimate of the deficiency of the working of the department during the coming year 1903-4, in accordance with the wish of the Finance Committee. This amount had been reduced, because, under the Act of 1902, they were entitled to carry to capital account a sum of at least £55,000. Deducting this sum, there was left a charge on the rates of £45,000 during the coming year. Barring any unforeseen delays, they would have the Welsh water by the summer of next year. Bad weather had prevented a good deal of progress with the work, and, in addition, they had had an outbreak of smallpox. They had practically finished building the three dams on the River Elan; and it only remained to close the culvert and impound the water. The most important, and most backward, work remaining was the filters; and they were working at these day and night.

After some discussion, the report was agreed to.

ELECTRICITY COMMITTEE.

Alderman BEALE, who, in the absence through ill-health of the Chairman, presented the report of the Electric Supply Committee, said he was sure the Council would be glad to find that the department had apparently turned the corner. The revenue account showed that they had spent £12,865 on coal and on fuel, as against £14,099 last year. This was due to better contracting for coal. Up to last year, they still felt the effect of the coal boom. Now they were through it; and they had done very much better in consequence. Wages had gone up from £4600 to £4900. The special expenditure on the conversion of the system was £4035. This item had been appearing in previous years with a very much higher figure to it; and he was glad to say that this was the last time it would appear, and the revenue account would be relieved of it. The result this year was that they had a balance of £30,593 to carry to the profit and loss account, against £18,514 last year. Looking at the other side, there was, roughly speaking, an increase of 10 per cent. on the sales of current. After making all the statutory charges, they had a surplus of £6787, as compared with a deficiency last year. It was a question what they should do with the surplus. The Town Clerk said that they must either pay it over to the improvement rate or to the reserve fund; and they took the alternative of putting it to reserve. It was clearly inopportune to part with it; and if the accounts should not come out as well next year as they hoped, all they would have to do would be to draw from the reserve.

The report was adopted; and it was agreed to make reductions aggregating £9000 a year in the charge for current, and to accept the resignation of the Engineer (Mr. J. C. Vaudrey). A successor is to be advertised for at a salary of £1000; while Mr. Vaudrey is to be accessible for consultation for twelve months at a fee of 500 guineas.

HALIFAX GAS-WORKS EXTENSIONS.

Further Borrowing Powers Sought.

An inquiry was held at Halifax last Wednesday by Colonel A. G. Durnford, on behalf of the Local Government Board, with respect to an application by the Corporation for power to borrow £53,254 for gas-works extensions. Considerable opposition was manifested; and there was a large attendance of members of the Council, representatives of the Halifax Ratepayers' Association, and general ratepayers. One of the principal items was £17,558, capital expended in 1902 beyond the existing borrowing powers, the remainder being for new works required in view of an anticipated increased demand for gas. Mr. C. T. Rhodes, on behalf of the Ratepayers' Association, said he proposed first to go into the general finances of the borough, and afterwards to deal with the gas-works. The Inspector, however, said he thought the former question was outside the scope of the inquiry. Mr. Rhodes suggested that, as there was a possibility of the gas-works proving a charge on the rates, he ought to have an opportunity of showing the general financial condition of the borough. The Corporation had sought by means of a Bill permission to borrow £585,850 for gas-works purposes; but only £221,400 was sanctioned, Parliament refusing the remainder. The Town Clerk (Mr. J. Keighley Walton) replied that there was no refusal; the Corporation were simply referred to the Local Government Board. Mr. Rhodes said the Corporation had previously spent on the gas-works the £60,000 in respect of which they were "whitewashed" by Parliament last year (it having been expended before the promotion of the Bill), making with the present application £113,254 for last year and this. It was explained that the demand for gas had been steadily progressive for the last ten years; the consumption having increased from 588 million cubic feet in 1891 to 870 millions in 1901. Last year there was a falling off, which was attributed partly to the increase in incandescent lighting. They could, however, have sold more gas last year, if it had been possible to make it. Up to March, 1902, there had been a total capital expenditure on the gas-works of £635,846, of which £114,496 had been repaid. For the four years previous to March, 1902, the expenditure on the works was £199,939; and since then, roughly speaking, there had been another £17,000 spent. According to the 1902 accounts, there was a loss on the trading for the previous year of £13,197. On further statements being put forward in opposition, with regard to the finances of the borough, the Inspector said he should advise the gentlemen who made them to apply to the Local Government Board for an inquiry into the question. Mr. Scarborough, who was a member of the Gas Committee some 25 years ago, objected to the way in which the gas-works assets were made to include property to the extent of over £100,000 which had been demolished years ago. The Inspector said he would like to ask the Chairman of the Gas Committee whether, in case the present application were not granted, Halifax could be supplied with gas next winter. The Chairman (Mr. G. H. Wadsworth) replied that, if the loan was not granted, the supply would be seriously jeopardized. Whatever might have been the shortcomings of past Committees, the present one believed everything now proposed was necessary for the wellbeing of Halifax.

HEYWOOD CORPORATION GAS SUPPLY.

The Engineer's Report.

Mr. W. Whatmough, the Gas Engineer to the Heywood Corporation, has presented to the Gas Committee his report on the working of the undertaking in the twelve months ending the 31st of March last. The receipts for gas sold amounted to £16,353, as against £16,347 in the preceding year. Compared with four years ago, they show a net increase of £370, due entirely to stoves, motive power, and prepayment meters; the former exhibiting an increase of £604, and the latter, of £521. On the other hand, the receipts for private lighting and mills show a decrease of £658, and for public lamps a drop of £96. There was an increased revenue from residuals of £391 10s. 6d., made up as follows: Coke, £15 6s. 7d.; tar, £110 11s. 11d.; and sulphate of ammonia, £265 12s. This was due principally to the improved prices obtained for tar and sulphate of ammonia. The great saving for the year, however, was in the coal and cannel account, which showed a decreased expenditure of £1496 3s. 8d., due to the reduction in the price of coal, improved carbonization, and benzol enrichment. During the year, 368 tons of cannel and 12,423 tons of coal were carbonized, or a total of 12,791 tons, against 12,877 tons for 1902—a decrease of 86 tons. The gas made per ton of coal was 10,119 cubic feet, against 10,084 cubic feet—an increase of 35 cubic feet per ton. The quantity of benzol used was 2380 gallons. The total bulk of gas manufactured amounted to 129,442,000 cubic feet; being a decrease of 414,000 cubic feet, or 0·32 per cent., on the make in 1901-2. The quantity of gas sold was 117,565,288 cubic feet, or a falling off to the extent of 283,964 cubic feet. The gas consumed through prepayment meters again showed a considerable increase; being 4,808,364 cubic feet, compared with 3,386,950 cubic feet before, or an increase of 1,421,414 cubic feet. For stoves and motive power, there was an additional consumption to the extent of 1,340,600 cubic feet. The gas not accounted for was 11,057,662 cubic feet, representing a leakage of 8·54 per cent., compared with 8·51 per cent. for 1902. During the year, the Committee undertook the maintenance of incandescent burners for consumers; and Mr. Whatmough states that so far the response has been favourable. He closes his report with an expression of regret that the consumption of gas for lighting again showed a decrease during the past year, no doubt due to the large use of incandescent burners and electric lighting in the borough, as well as to the exceptionally mild winter. At the same time, he congratulates the Committee on having had, on the whole, a successful year's working.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 516.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	April 17	10½	Alliance & Dublin 10 p.c.	19—20	..	5 5 0
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
200,000	5	May 14	6½	Bombay, Ltd.	5⅛—6*	..	5 8 4
140,000	5	,,	6½	Do. New, £4 paid	4—4⅛*	..	5 15 7
380,000	Stk.	Feb. 26	12	Brentford Consolidated	240—245	..	4 18 0
286,700	,,	,,	9	Do. New	178—183	..	4 18 4
50,000	,,	,,	5	Do. 5 p.c. Pref.	131—136	..	3 13 6
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	110—113	..	3 10 10
220,000	Stk.	Mar. 12	10½	Brighton & Hove Orig.	212—217	..	4 19 1
246,320	,,	,,	7½	Do. A. Ord. Stk.	151—156	..	4 19 4
460,000	20	Mar. 31	10	British.	39—40	..	5 0 0
100,000	Stk.	Mar. 12	6	Bromley, 5 p.c. "A"	118—123	..	4 17 7
165,700	,,	,,	4½	Do. 3½ p.c. "B".	90—95	..	4 14 9
500,000	10	May 14	7	Buenos Ayres (New) Ltd.	11¼—11⅜*	..	5 19 2
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	94—96	..	4 3 4
150,000	20	Mar. 12	8½	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 26	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
1,375,000	Stk.	Feb. 26	5	Commercial 4 p.c. Stk.	103—106	..	4 14 4
503,750	,,	,,	4¾	Do. 3½ p.c. ,,	99—102	..	4 13 2
407,812	,,	—	3	Do. 3 p.c. Deb.,,	89—92	..	3 5 3
800,000	Stk.	Dec. 11	8	Continental Union, Ltd.	120—130	+5	6 3 1
200,000	,,	,,	7	Do. 7 p.c. Pref.	140—145	..	4 16 7
575,000	Stk.	Feb. 26	5⅛	Crystal Palace Ord. 5 p.c.	113—118	−2	4 10 2
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—125	..	4 0 0
106,158	,,	Jan. 15	5	Do. 5 p.c. Deb. Stk.	137—140	..	3 11 5
486,090	10	Jan. 29	10½	European, Ltd.	18—19	..	5 10 6
354,060	10	,,	10½	Do. £7 10s. paid	13—14	..	5 12 6
15,243,200	Stk.	Feb. 12	4⅛	Gas- 4 p.c. Ord.	86—88	..	5 0 0
2,600,000	,,	,,	3½	light 3½ p.c. max.	85—87	..	4 0 6
3,799,735	,,	,,	4	and 4 p.c. Con. Pref.	108—110	..	3 12 9
4,193,975	,,	Dec. 11	3	Coke 3 p.c. Con. Deb.	88—90	..	3 6 8
252,500	Stk.	Mar. 12	5	Hastings & St. L. 3½ p.c.	90—95	..	5 5 3
70,000	10	Oct. 30	8	Hongkong & China, Ltd.	15—16	..	5 0 0
3,800,000	Stk.	May 14	10	Imperial Continental	202—206*	+1½	4 17 1
473,600	Stk.	Feb. 12	3½	Do. 3½ p.c. Deb. Red.	100—103	..	3 8 0
165,242	Stk.	Mar. 12	6	Lea Bridge Ord. 5 p.c.	115—120	..	5 0 0
561,000	Stk.	Feb. 26	10	Liverpool United A	218—220	..	4 10 11
718,100	,,	,,	7	Do. do. B	166—168	+2	4 3 4
306,083	,,	Dec. 31	4	Do. do. Deb. Stk.	112—114	−1	3 10 2
75,000	5	Dec. 11	5	Malta & Medn., Ltd.	4⅛—5	..	5 0 0
560,000	100	April 1	5	Met. of 5 p.c. Deb.	103—107	..	4 13 6
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	101—103	..	4 7 5
541,920	20	Nov. 13	3½	Monte Video, Ltd.	10—11	..	6 7 4
1,515,892	Stk.	Feb. 20	4½	Newc'tle & G'tesh d Con.	104—105	+½	4 5 9
376,855	Stk.	Jan. 2	3½	Do. 3½ p.c. Deb.	96⅛—97⅛	..	3 11 10
300,00c	Stk.	May 14	8	Oriental, Ltd.	140—145*	..	5 10 4
600,000	5	Mar. 31	7	Ottoman, Ltd.	6—7	..	5 0 0
105,005	Stk.	Jan. 15	6½	Ply'mth & St'house 5 p.c	127—132	..	4 12 9
851,070	10	April 30	7	River Plate Ord.	11½—11¾	..	5 19 2
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb..	95—97	..	4 2 6
250,000	10	April 17	8	San Paulo, Ltd..	12—13	..	6 3 1
135,000	Stk.	Mar. 12	10	Sheffield A	239—241	..	4 3 0
209,984	,,	,,	10	Do. B	237—240	..	4 3 4
523,498	,,	,,	10	Do. C	237—239	..	4 3 8
103,235	Stk.	Mar. 31	5	Shrewsbury Ord. 5 p.c.	111—114	..	4 7 9
6,000,000	Stk.	Feb. 12	5⅜	South Met., 4 p.c. Ord.	118—121	..	4 8 2
1,780,000	,,	Jan. 15	3	Do. 3 p.c. Deb.	90—92	..	3 5 3
380,940	Stk.	May 14	5	Southampton Ord.	105—110*	..	4 10 11
87,950	,,	Jan. 15	4	Do. 4 p.c. Deb.	103—106	..	3 15 6
120,000	Stk.	Feb. 26	6	Tottenham and Edmonton A. 5 p.c. B. 3½ p.c.	117—122	..	4 18 4
300,520	,,	,,	4½		96—99	..	4 10 11
182,380	10	Dec. 30	8	Tuscan, Ltd..	8½—9½	..	8 8 6
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	94—96	..	5 4 2
730,872	Stk.	Mar. 12	5	West Ham, 5 p.c. Ord.	95—100	..	5 0 0
				WATER COMPANIES.			
780,662	Stk.	Dec. 30	11⅓	Chelsea, Ord.	315—325	..	3 10 9
150,000	,,	,,	5	Do. 5 p.c. Pref.	145—150	..	3 6 8
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	130—140	..	3 4 4
175,785	,,	Mar. 31	4½	Do. 4½ p.c. Deb.	137—142	..	3 3 5
1,720,560	Stk.	Mar. 31	8	East London, Ord..	240—245	+3	3 5 3
654,740	,,	Dec. 11	4½	Do. 4½ p.c. Deb.	142—147	..	3 1 3
1,282,943	,,	,,	3	Do. 3 p.c. Deb.	96—98	..	3 1 3
700,000	50	Dec. 11	10†	Grand Junction 10 p.c. max.. 4 p.c. Deb..	142—146	−1½	3 8 6
310,000	Stk.	Mar. 31	4		123—128	..	3 2 6
708,000	Stk.	Feb. 26	10½	Kent	300—310	+5	3 7 9
160,000	,,	,,	7	Do. New, 7 p.c. max..	200—205	+2½	3 8 4
1,043,800	100	Dec. 30	11	Lambeth, 10 p.c. max..	320—330	+5	3 6 8
406,200	100	,,	8½	Do. 7½ p.c. max..	225—235	..	3 12 4
350,000	Stk.	Mar. 31	4	Do. 4 p.c. Deb..	122—127	..	3 3 0
500,000	100	Feb. 12	12⅝	New River, New Shares	435—445	+40	2 17 6
1,000,000	Stk.	Jan. 29	4	Do. 4 p.c. Deb..	123—128	..	3 2 6
902,300	Stk.	Dec. 11	7	South-wark and Ord. 7½ p.c. max. 5 p.c. Pref.	280—285	+2½	2 9 2
126 500	100	,,	7		215—225	..	3 2 3
489,200	Stk.	,,	5		150—153	..	3 5 4
1,019,585	,,	Mar. 31	4	Vauxhall 4 p.c. A Deb.	122—127	..	3 3 0
1,155,066	Stk.	Dec. 11	10	West Middlesex.	300—310	+2½	3 4 6
200,000	,,	,,	4½	Do. 4½ p.c. Deb.	138—143	..	3 2 11
200,000	,,	Mar. 12	3	Do. 3 p.c. Deb.	95—97	..	3 1 10

* Ex. div.

† Next dividend will be at this rate.

PUBLIC LIGHTING IN EDINBURGH.

An Interesting Comparison.

Suggestions have lately been made in regard to introducing an improved system of public lighting in Edinburgh; and the subject has been pretty freely discussed in the Ratepayers' Union and elsewhere. In view of this fact, Mr. J. T. R. Wilson, who is a member of the Gas Commission and also of the Electric Lighting Committee, has sent to the papers an interesting comparison of the various methods of lighting at present available. He submits his particulars (for many of which he acknowledges his indebtedness to Mr. W. R. Herring and Mr. F. A. Newington, the Chief Engineers of the Gas and Electric Light Departments) as emanating from one who can fairly claim to be "entirely unprejudiced in favour of any system, except as regards a natural preference for the most economical and efficient one." With this introduction, Mr. Wilson proceeds as follows:—

We have in Edinburgh at present practically only two methods of street lighting—by the ordinary gas-lamps, and by the electric arc lamps; and there are also available for consideration the incandescent gas-lamps and the Welsbach self-intensified gas-lamps. Particulars of these lamps are as follows:—

Lamp.	Light Given.	Annual Cost.	Cost Complete.	Light Given for £12 10s.*
Ordinary gas (2 ft. per hour)	5 c.p.	£1 5 0	..	50 c.p.
Incandescent gas 3 ft. ,, .	100 ,,	1 19 0	..	641 ,,
Electric arc	500 ,,	12 10 0	£40 0 0	500 ,,
Self-intensified gas . . .	650 ,,	8 7 6	14 10 0	970 ,,

* Cost of arc lamp.

The cost per annum of the gas-lamps is based on the reduced price of gas shortly expected to come into force. The annual cost of the electric lamps is also based on the proposed reduced price, while the cleaning, lighting and extinguishing, and maintenance are included in all cases. Thus we see that, so far as economy and efficiency go, self-intensified gas is first, incandescent gas second, electricity third, and ordinary gas fourth. So costly and inefficient is the ordinary gas-burner, that it can be easily understood how it has been dropped almost entirely on the Continent, while in this country it is also rapidly being supplanted by the incandescent system, as I shall show later.

Coming now to the capital expenditure required to make the different changes which have been suggested as advisable to modernize the Edinburgh street lighting, there are four alternatives, one of which it is practically certain must soon be adopted, as Edinburgh cannot indefinitely continue lighting its gas-lit streets with 5-candle lamps. For the sake of clearness, I adopt the tabular form, showing the capital expenditure and the annual interest charge; also showing the annual cost of the present system for comparison. The figures in the first line are for electric lamps as now, and the existing gas-lamps fitted with incandescent burners and new lanterns, giving 18 to 20 times as much light as the present system. Those in the second line show the cost of substituting the more powerful self-intensified lamps for the existing electric lamps, and fitting the gas-lamps with incandescent burners and new lanterns. The third line gives the cost of fitting up electric lamps over the entire city ($3\frac{1}{2}$ gas-lamps being removed for each electric lamp), and including new electric mains necessitated by the change. The fourth line shows the cost of substituting self-intensified lamps for electric lamps on the same posts, also of lighting the whole of the city by self-intensified gas, removing four gas-lamps for each new lamp.

	Capital Expenditure Required.	Annual Interest Charge.	Annual Cost of Street Lighting
1. Electric lamps as now . .	£15,000	£450	£30,580
2. Substitute self-intensified lamps.	23,000	690	26,950
3. Electric lamps over city .	130,000	3900	46,850
4. Substitute self-intensified lamps.	44,000	1320	28,390
5. Present system	—	—	23,550

Having given these figures, I need not emphasize further the enormous advantages of incandescent gas for street lighting. It may be pointed out that although an electric arc may give 500-candle power, and $3\frac{1}{2}$ incandescent lamps only 350-candle power, yet, owing to the great height of the electric light from the ground, and the efficient reflectors in incandescent lanterns, as much light is actually thrown on the ground by the cheap incandescent light as by the enormously costly electric lamps.

In conclusion, let me say that, while convinced that electric street lighting by means of arc lamps is out of date, I wish to draw no invidious distinctions between the two lights. Each has its own sphere of usefulness; and while gas is supreme for heating and cooking, and, by means of incandescent gas-burners, for street lighting, electricity, with its cleanliness and flexibility, is unrivalled as a source of power and for domestic and indoor lighting.

[Mr. Wilson appended to his letter a table showing how incandescent gas lighting has advanced in some of the great English cities and towns, in comparison with Edinburgh; Oxford, Folkestone, Bradford, Plymouth, and Ramsgate having had incandescent gas solely for the past three years.]

STUDENTS AT THE SMETHWICK GAS-WORKS.

A party of students from the Smethwick Technical School recently assembled at the gas-works, where they were joined by the Principal (Dr. Lyster), the Chairman of the Gas Committee (Mr. Pinkney), and the Gas Engineer (Mr. Vincent Hughes), and were conducted over the establishment. The Smethwick works have been so recently

FOR RELIABLE

VALVES

OF ALL KINDS FOR GAS-WORKS

SEND YOUR ORDERS DIRECT TO

C. & W. WALKER, Ltd.,

MIDLAND IRON WORKS:
Donnington, near Newport,
Salop.

LONDON OFFICE:
110, Cannon Street,
E.C.

NEW EDITION of VALVE CATALOGUE SENT on APPLICATION.

described in the "JOURNAL" that it will be sufficient to give here a brief indication of the course taken by the visitors. The new plant for making carburetted water gas was first inspected; and the whole process was fully explained. The party then passed on to the inclined retorts, about thirty of which they saw at work. A look down one of these red-hot sloping retorts was a sight which those who witnessed it will not readily forget. By way of contrast, some of the old-fashioned hand-charged horizontal retorts were shown in operation. The next move was to the condensing and purifying plant; and as a large new purifier was just ready for use, and had its cover raised, most of the party were able to enter the vessel and inspect the arrangements. The machinery on the works—governors, exhausters, &c.—was afterwards visited, and then the gas was followed to its temporary resting-place in the holders. At each stage in the manufacturing operations, lucid explanations were furnished by Mr. Hughes. At the close of the inspection, the party assembled in the offices, where they were hospitably entertained by Mr. and Mrs. Hughes. At the conclusion, Alderman Lones proposed a vote of thanks to Mr. Hughes for the kindness and attention he had shown the party. He also paid a very high tribute to his abilities, and said he was delighted that Smethwick had been able to procure the services of so able and accomplished a Manager. The proposition was seconded by Mr. Pinkney, who said he had been very agreeably surprised, when Mr. Hughes came to Smethwick, to find he was not only a skilled gas-works manager, but also an engineer of the very first water. The proposition having been cordially received, Mr. Hughes, in reply, said he was overcome by the many flattering remarks that had been made. When the visit was suggested, he was very pleased to arrange everything, so that it might be as instructive and interesting as possible. The visit concluded with a vote of thanks to Mrs. Hughes and other ladies who had assisted.

METERS LIMITED.

Alderman John Miles, the Mayor of Bolton, last Tuesday presided over the sixth annual meeting of Meters, Limited, when the report and accounts, which were noticed in the JOURNAL for the 12th inst. (p. 399), were adopted. The Chairman said he thought the shareholders would agree with him that the report was very satisfactory. The results shown had not been achieved by any increase in the prices received for the articles made or by any marked reduction in the cost of materials, but by the excellence of the management, and the great care bestowed on turning out thoroughly reliable goods. Alluding to a remark in the Auditors' report, that "no depreciation has been written off patents and goodwill," he observed that on the prospectus the valuation included the various properties, assets, patents, and goodwill taken over by the Company all lumped together. This valuation was confirmed by different experts; and he contended that, if the valuation was good then, it was good now. In support of this, he would point out that the average profit for the three years previous to Meters Limited taking over these concerns was £30,705 a year; and in the best year (which was the year in which they were transferred) the amount was £38,625. If the patents were worth so much, then he held that now they were worth more; for the average profit of Meters for the last three years had been £35,759, and for the best year (this year) the profit was £40,372. He thought this ought to be an answer to the suggestion that something ought to be written off for patents and goodwill. What they had written off—£22,677—had been taken off the whole of what stood to the debit of assets. Therefore it appeared to the Directors that it was not necessary to write off depreciations from patents and goodwill specifically. It should be remembered, moreover, that they had set up a reserve fund, which now stood at £25,000; and if the necessity arose, this could be transferred and written off patents and goodwill. The dividends recommended were subsequently declared.

ELECTRIC LIGHTING NOTES.

The Position in Bermondsey.

On Tuesday the Borough Council of Bermondsey considered a report from the Electric Light Committee recommending extensions to the amount of £51,552. The Finance Committee opposed the proposal on the following grounds: (1) That the estimate did not include any charge for the additional land required; (2) that the anticipated profit on last year's working of £314 turned out to be a deficit of £474; and (3) that no provision had yet been made for a reserve fund or depreciation account. Mr. Layman, the Chairman of the Finance Committee, pointed out that the public lighting was now costing £8136 per annum, against £6819 when gas was used. They had already spent £50,000 on electric lighting, and could not make it pay. Alderman Tyler stated that, notwithstanding the increased price of street lighting, there was less light now than that furnished by gas. Mr. Stevenson remarked that, although he was a strong supporter of municipal trading, he could not shut his eyes to the fact that the light given by electricity in the borough was very bad. After a discussion which lasted over three hours, it was resolved to carry out the extensions recommended.

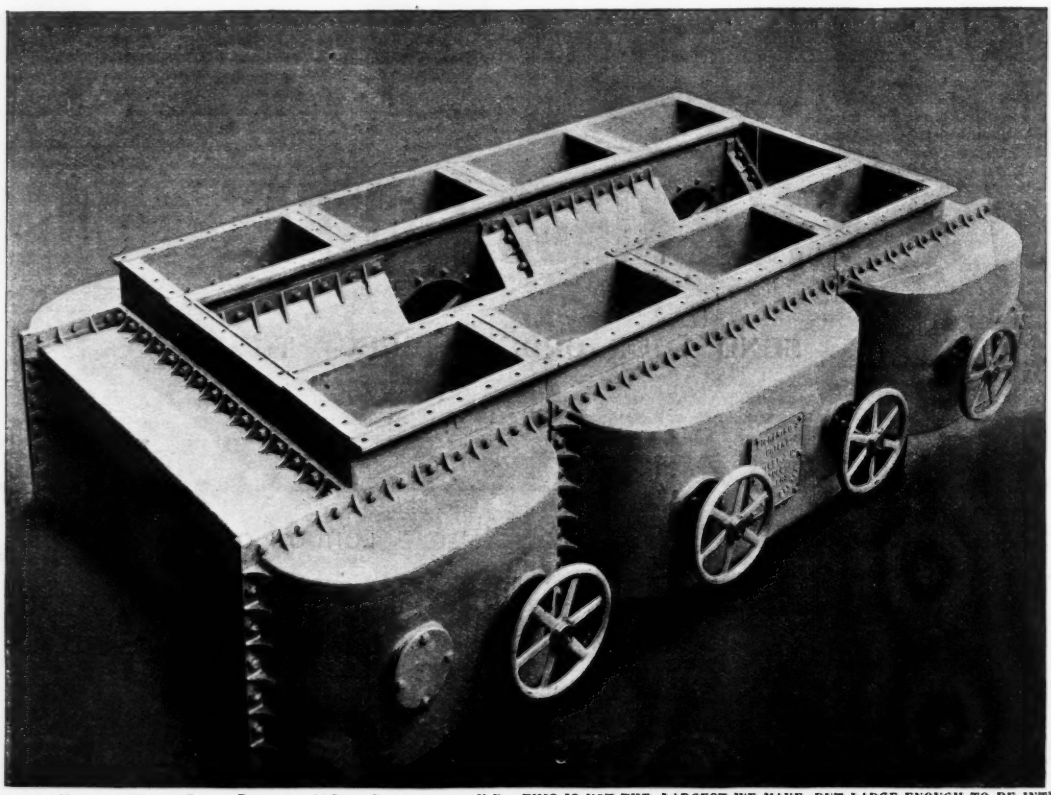
The Austrian Government and Vienna Electric Light Companies.

The Vienna correspondent of the "Financial News" has just furnished a striking picture of petty persecution of the private electricity supply works by the city authorities in Vienna; remarking in regard thereto that such a state of affairs can scarcely be imagined abroad. The current for electric lighting is being supplied from three works, upon which the Municipality hold a purchase right on three fixed dates. They did not avail themselves of the option when it first became due, but decided upon the erection of municipal electricity works, which are now in full swing. In conformity with the original

PICKERING'S PATENT PURIFIER VALVES.

No Connections. Easy to Work. Small Cost. Space Saved. Absolutely Sound. Most Simple.

Apply WILLEY & CO., ENGINEERS, LONDON AND EXETER.



VIEW OF CENTRE-VALVE TO WORK 4 LARGE PURIFIERS 24-INCH CONNECTIONS. N.B.—THIS IS NOT THE LARGEST WE MAKE, BUT LARGE ENOUGH TO BE INTERESTING.

arrangements, the private Companies are only allowed to lay cables with the permission of the Municipality, who, in order to further their own works at the expense of their competitors, thought it advisable to prevent the latter from laying cables. The Companies appealed to the Courts; but judgment has not yet been given. Meanwhile, *pourparlers* with a view to bringing about a friendly arrangement have failed; the City declaring its determination to hinder the Companies in their development. Even still worse was the attempt to prevent them from connecting the houses with the cables already existing. The injunction, however, was not granted. A new method of vexation was then hit upon. In virtue of street police powers, the city representatives forbade the Companies to break up the pavement for the purpose of connecting houses with the main. Police and firemen were ordered out to see that the ukase was not infringed. The Companies have applied to the Government for protection, and the solution is now being awaited.

WEST MIDDLESEX WATER-WORKS COMPANY.

The Half-Yearly General Meeting was held at the Office, No. 19, Marylebone Road, on Tuesday last, under the presidency of Mr. JACKSON HUNT (the Deputy-Chairman).

The SECRETARY (Mr. F. H. Wybroo) read the notice convening the meeting, and subsequently the Auditors' report. This stated that the capital of the Company amounted to £1,986,228; and that the total expenditure on the works amounted to £1,962,122, including £3033 expended in the half year. The revenue for the six months ended Lady-day last was £154,944, as compared with £151,835 for the corresponding period of the previous year. The water-rental received during the half year to March 31 was £148,658; and the balance to the credit of the dividend and interest account was £58,775.

The CHAIRMAN, in moving the adoption of the report and accounts, said he was sure that the proprietors would all regret, as he himself did, the absence of Mr. Boulnois. As they were aware, their Chairman had undergone a slight operation; but the Directors had received a favourable communication from him that morning, and they hoped that within a week or ten days he would be with them again. Since the last general meeting, they had had to regret the death of their late colleague, Mr. E. H. Johnstone. Mr. Hervey had retired since the last meeting, as was on that occasion foreshadowed to the proprietors—his resignation being purely on account of family reasons. The Board hoped, however, to have Mr. Hervey's assistance as a professional adviser before the Arbitrators. He had been succeeded by Mr. Rutter, who had served with them for many years. He had to congratulate the proprietors again on the continued prosperity of the Company. They had heard by the Auditors' report that there was an increase of about £3100 in the revenue for the past half year as compared with that of the corresponding period of the previous year; and this was quite independent of a windfall of about £2000 which was received from another Company for water sold to them. The Board had also been able out of income to replace the £6000 to the reserve fund which was previously borrowed from it. Probably, the shareholders regarded the first paragraph in the Directors' report as the most interesting. After many years, he might say, they had at last got to close quarters with the new purchasing body. The Company's statement of claim was presented last Saturday. In its preparation the Directors were assisted by the best Counsel they could obtain; and they were advised by the most eminent expert witnesses. Both Counsel and witnesses had been ably and assiduously assisted, not only by the Company's Solicitor, but also by Mr. Wybroo, who had devoted himself most earnestly to this matter. The proprietors would not expect him—and it would be very unbecoming in him—to go into any details of the Company's claim. He thought, however, he was justified in saying this, that for the last fifty years they had paid, or made up in the shape of back-dividends, 10 per cent. on the capital of the Company; and the Directors saw no reason whatever why this income should not be continued in perpetuity. The Company's works were in the most excellent condition. They now had the large new main which brought their water from Hampton. They also had their own very fine reservoirs at Barn Elms; and, in addition, there were the splendid reservoirs at Staines to fall back upon in case of emergency. Further, there was the scheme of intercommunication between the different Companies. Had the West Middlesex continued its existence as a Company, he believed that they would never have had occasion to come upon the intercommunication scheme, excepting in the event of some extraordinary breakdown. But, still, they could fall back upon it in case of any emergency. To sum up the position in a few words, he might state that the Company were amply provided with storage reservoirs and large mains for many years to come. Owing chiefly to the forethought of their Chairman, they had also a site on Dollis Hill, which was available at any time for a new service reservoir when this was required by their continually increasing district in the direction of Willesden. They certainly had nothing to fear as to the failure of their works or anything of that kind. As the proprietors were aware, there were eight Companies to be taken before the Arbitrators; and it might interest them to know that the New River Company came first and the West Middlesex fourth. He did not suppose, therefore, that anything would be settled very immediately. Perhaps, next November, but more probably next May, the Directors would be able to say more about the matter. Of course, the purchasers would fight for a good bargain, and they would all do so; but he did not think there was any reason to doubt that the contest would be conducted in a perfectly fair and honourable way.

A PROPRIETOR asked if the reserve fund would go to the shareholders.

The CHAIRMAN replied that he feared not; everything would go to the new purchasing body. He then put the motion, which was carried unanimously.

IN EVERY CORNER Of the Kingdom. IN EVERY CORNER

The "EUREKA" is **well used** and **well liked.**

IN EVERY CORNER IN EVERY CORNER

Resolutions were afterwards passed declaring a dividend on the consolidated stock for the half year ended March 31 at the rate of 10 per cent. per annum, payable, less income-tax, on and after July 6, and re-electing the retiring Directors and Auditors.

On the motion of Mr. SWIFT, seconded by Mr. H. A. WAKEMAN-NEWPORT, a cordial vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN, in acknowledging the vote, thanked Mr. Swift for his kind recognition of the Directors' services in the past. He might, however, state that, if possible, still more important work had to be done in the future. The next few months would be a very anxious time for them; but he was sure that they would be well supported by the staff. The Secretary thoroughly understood all the details of the very complicated accounts which would have to be unravelled; but, as he (the Chairman) had said before, he thought they would come through the ordeal satisfactorily.

The meeting was then declared special; and a resolution to raise sufficient debenture stock to produce £20,500 was submitted.

The CHAIRMAN said the arrangement made in connection with the intercommunication scheme was that each Company should carry out so much of the requisite works as was situated in their own district, and should in the first instance pay for the work so carried out. Their own Company had had a comparatively small amount of work to do; but it had cost them £20,270, by which amount they were at the present time out of pocket. They were going to raise £230 more than they had spent; this being for the expenses of issue, &c.

Mr. PRESCOTT seconded the motion.

The CHAIRMAN, in answer to questions, stated that the stock would have to be offered by public tender under the Act. He was advised that there was no power to issue the stock in amounts of less than £100. The Directors would, however, look into the matter; and if they could meet the small investor, they would be very pleased to do so. The interest on the stock was 3 per cent.

The motion was carried unanimously; and the proceedings then terminated.

METROPOLITAN WATER BOARD.

Appointments of Clerk and Law and Parliamentary Adviser.

A Special Meeting of the Board was held last Friday, at the offices of the Metropolitan Asylums Board, Victoria Embankment—Mr. R. W. Beachcroft presiding. The General Purposes Committee reported that three names had been selected from those who had applied for the position of Clerk to the Board—viz., those of Mr. G. W. Clarke (Town Clerk of Stepney), Mr. A. B. Pilling (Town Clerk of Devonport), and Mr. William Terrey (General Manager of the Sheffield Corporation Water-Works). The Chairman read a letter from Mr. Clarke withdrawing his application. The Committee recommended that the Clerk should be appointed at a salary of £1500 per annum, and that the appointment should be subject to the following conditions: (1) That he should give his whole time to his duties; (2) that he should not be allowed to undertake, or be concerned in, any other business than that of the Board; and (3) that he should not, on retirement, claim or be entitled to any pension under the Superannuation Act, 1866. Some discussion took place on the question of pension, and the matter was referred back to the Committee for further consideration. Mr. Pilling and Mr. Terrey, the candidates, came before the Board, and after they had withdrawn, the Chairman of the Committee (Mr. H. Clarke) moved that Mr. Terrey be appointed Clerk to the Board. Eventually Mr. Terrey was appointed. The motion was adopted; the voting being 38 for and 9 against. The Law and Parliamentary Committee recommended: (1) That they should be authorized to engage the services of Messrs. Linklater as Solicitors for the purpose of preparing and conducting the case of the Board before the Court of Arbitration; and (2) that Mr. H. L. Cripps should be engaged to act as Adviser to the Board and the Law and Parliamentary Committee. Having conferred with Mr. Cripps, the Committee found that he was willing to accept the position suggested of Special Adviser to the Board, being associated with and advising the Solicitors engaged in the conduct of the case, on the terms of receiving a specific fee of 500 guineas by way of retainer in respect of each of the cases of the eight Companies, and a covering retainer of 500 guineas in respect of the minor arbitrations and agreements, and an additional fee of 500 guineas in the event of the arbitration proceedings not being completed within 18 months. The recommendations of the Committee were agreed to. With reference to the proposal that the Board should continue the rainfall records which have been kept by the London County Council (*ante*, p. 311), it was decided that no outlay should be incurred in regard to the matter.

WATER PROFITS AT WALMER.

It was announced at a recent Meeting of the Walmer District Council that since the acquisition of the local Water Company's undertaking in 1897 by the Deal and Walmer Joint Water Board a profit of £2127 has been realized; and this gratifying result has enabled the Water Committee to recommend a reduction of 25 per cent. on domestic rentals and trade supplies, as well as a substantial rebate on the charge made for baths and extra water-closets and other allowances. This, it is anticipated, will still leave a yearly surplus of £300, to be dealt with as they should think fit. The question which is at present agitating the Council, however, is as to what should be done with the accumulated profit of £2127. This the Committee suggested should be appropriated as follows: In wiping off capital expenditure

TWO NEW PATENTS

. . Have been added to LITTLE'S Successful . .

HOT COKE CARRIER

COLD COKE CARRIER

SWINGING BUCKETS AND RUNNING ROLLERS WITH CONTINUOUS AUTOMATIC LUBRICATION TO ROLLERS.

NEW CONVEYOR CO., LD., SMETHWICK.

incurred chiefly for meters, and in respect of which a loan for a short term only would be sanctioned, £206; to reserve fund, £300; honorarium to the Water Surveyor (Mr. Cullen) for extra services, £50; in relief of the rates, £1000; and working capital, &c., £571. The Chairman of the Water Committee (Mr. Hinds) having fully explained the position of affairs to the Council, Mr. Denne said he thought the water consumers should have had the benefit that was conceded to the ratepayers. The Admiralty were supplied at cost price—7½d. per 1000 gallons; while for the water he consumed at his brickfields he had to pay 1s. per 1000 gallons. If the Admiralty participated in this bonus in relief of the rates, they would be getting their water at less than cost. Mr. Hinds replied that the Committee had considered the matter; but they did not see how it was possible to allocate a certain sum to the relief of rates, and exclude the Admiralty. There was no alternative, for the Act provided that any profits realized from the undertaking should go to the rates. Captain Royse said in that case he hoped the charges for baths would be still further reduced, so that the Admiralty should not benefit. Let everything be fixed as low as possible, so that the surplus should be used up. Mr. Denne moved that the question of the barrack water-rate be referred back to the Committee, to try and ascertain whether it would not be possible to make the proposed reduction in the district rate and exempt the Admiralty from it, in consideration of the fact that their payment for water was specially arranged by arbitration. The Committee might meet and endeavour to get out some scheme so that the Admiralty should not have the benefit of the private consumers' money. This was agreed to.

BUDE AND STRATTON WATER SUPPLY.

Opening of New Works.

The new water-works for the supply of Bude and Stratton were formally opened on Thursday last, amid a scene of popular rejoicing. General Sir Redvers Buller had been invited to perform the inaugural ceremony, and was himself the subject of a popular demonstration. An address was presented to him by the District Council; and among the other events of the day was a public luncheon, at which there were present, in addition to General Buller, the principal residents of the district, Mr. J. Fletcher Moulton, M.P., and Sir T. Dyke Acland. At the opening ceremony, Mr. J. H. Treleaven, the Chairman of the District Council, said they had done their best to provide a complete water supply, and that day would mark a new era in the development of the district. General Buller, in the course of a brief speech, referred to the attractions of the district, and congratulated the inhabitants upon having an abundance of pure water brought to their doors. For many years the idea of conveying water into Bude had been thought over and talked about; but they did not get it until they had a District Council of their own, who were able to do for them that which they wanted. Mr. G. Latham, on behalf of Mr. Baldwin Latham, the Engineer of the scheme, presented General Buller with a silver goblet as a memento of the occasion, and the water was then turned on. At the luncheon, Mr. Latham proposed the toast of "Success to the water-works," and mentioned that in 1896, when his firm were first called in, no fewer than seven schemes were considered and reported upon. In 1900 the district was entrusted with urban powers, and an Act of Parliament was obtained for the purchase of the undertaking of the Bude Canal Company, from whose reservoir the supply was derived. It may be added that the total cost of the scheme is about £23,000. The reservoir, which covers 70 acres, and has a capacity of 150 million gallons, is situated between 10 and 11 miles from Bude. The water flows in an open canal for about 4½ miles, and then enters a covered concrete tank, which acts as an intake and settling-tank. After the filter-beds there is a pure water reservoir with a capacity of 20,000 gallons; and near Stratton a service reservoir of 92,000 gallons. The mains are 6 inches in diameter to Stratton, and 4 inches from that place to Bude.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

For the second time within two years a Parliamentary Committee have refused to pass a Provisional Order applied for by the Corporation of Glasgow, the purpose of which was to consolidate the charges for public lighting and to make them all the subject of one assessment. I explained the other week what the Corporation proposed. The principal feature was this assessment, which was to be imposed equally upon owners and occupiers. How the scheme would work out was explained by Mr. J. Wilson, K.C. He said that the cost of lighting public streets was £40,884; for private streets and courts, £6652; and for common stairs, £38,219—a total of £85,755. The sum of £40,884 was recovered from occupiers directly, as part of the police assessment. Of the sum of £6652 for lighting private streets, £3604 was recovered from owners; being at the rate of 15s. per lamp. This left a deficiency of £3048 on that item. Of the cost of lighting common stairs £22,127 was recovered; leaving a deficiency on this head of £10,092. These two deficiencies had to be levied upon occupiers, in the general police rate. In short, owners were escaping with the payment of £3604 out of a total of £85,755. But when it was taken into account that they were allowed 20 per cent. for collecting from occupiers, it turned out that owners got the whole lighting free, and, in addition, had a balance of £1928 in their pockets. The occupier was actually paying more than the total cost of lighting. The effect of the Order would be to set free about £60,000 of police assessment, which would be available for other purposes. Counsel's statement was a little bit too candid, as it gave, with unnecessary frankness, the chief

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, M.E., Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO. TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	ACCRINGTON	500,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	TONBRIDGE	300,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	STRETFORD	500,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	OLDBURY	300,000
BIRKENHEAD	2,250,000	ST. CATHERINES (Second Contract)	250,000	TODMORDEN	500,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	YORK (Second Contract)	750,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	ROCHESTER (Second Contract)	500,000
HALIFAX	1,000,000	YORK	750,000	NEWPORT (MON.)	250,000
TORONTO	250,000	ROCHESTER	500,000	TOKIO, JAPAN	1,000,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	PERNAMBUCO (Brazil)	125,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	MALTON	150,000
MONTREAL	500,000	DULUTH, MINN.	300,000	DULUTH, MINN. (Second Contract)	300,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	BROCKVILLE (ONT.)	250,000
BELLEVILLE	250,000	LEICESTER	2,000,000	SMETHWICK	500,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	GRAVESEND	300,000
BRANTFORD Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	NEWPORT MON. (Second Contract)	250,000
		BURNLEY	1,500,000	TORONTO (Third Contract)	750,000
		KINGSTON-ON-THAMES	1,750,000		

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.
MONTREAL, ONT. (Second Contract) . . . . . 1,800,000 Cub. Ft.

ground of opposition to the Order, which was that the scheme was an attempt to take this £60,000 a year from the ratepayers by a sort of underhand means. In theory there is no doubt that the measure was a correct one; but when its effect is brought out, it is not to be wondered at there should have been strenuous opposition to it. It is in all ways desirable that there should be consolidation; and there is every probability that if the Corporation had tabled a scheme under which provision was made for remitting, in some way, the £60,000, instead of making it an additional charge, the Committee would have passed the preamble of the Order. I do not believe it was tenderness for the pockets of the landlord class which led the Committee to reject the scheme, but rather the feeling that the scheme was even yet, on its second presentation, incomplete. The Corporation seem not to be yet possessed of the opinion—which is the true one—that the lighting of a town is nearly all for the benefit of the dwellers in it, and only to a very small extent for the benefit of owners of property. When this view is taken, it is easy to reach the conclusion that to impose a lighting rate equally upon owners and occupiers is to ask owners to bear more than a reasonable share of the cost of public lighting. Even if that were not sound as a general proposition, it is directly applicable to the case of Glasgow, where the Municipality have allowed a system of charging to grow up which threw nearly the whole burden upon occupiers, and are now endeavouring to make a radical change—at the expense of one of the parties and to the advantage of the other.

The lighting of the whole of the city of Edinburgh by electricity, which has been a very fond dream of certain enthusiasts, has got a check. At a meeting of the Committee on Wednesday, an important report was submitted from Mr. Newington, the Electrical Engineer, on the proposed extension of electric lighting in the city. He estimated that seventy miles of streets remained to be lighted with electricity, and that to light up these would involve a capital expenditure of £184,000. For the redemption of this sum, and for the increase in the working expenses of the department, there would be a yearly addition to their expenditure of £35,000. The Committee, it is reported, were somewhat staggered by the figures, and before considering them directed that the report should be printed and circulated.

The Corporation of Broughty Ferry are to be allowed to borrow the £25,000 which they require for the gas undertaking. It was known on Tuesday night that the Secretary for Scotland had granted the application. He made strict inquiry into the circumstances, due, it is supposed, to the action of one of the Commissioners in writing a letter to his Lordship, containing a criticism of the policy of the Corporation. The criticizing councillor has now the satisfaction, if he has no other feeling, of knowing that he has been the means of giving one or two of his colleagues a nice trip to London at the expense of the burgh.

At the annual meeting of the Newburgh, Fife, Gas Company this week, it was reported that £502 had been derived from the sale of 1,371,100 cubic feet of gas. The total income was £534. The average price of coal was 25s. per ton, and the yield of gas from it 8500 cubic feet per ton. The price of gas is 7s. 6d. per 1000 cubic feet, with a discount of 10 per cent. to large consumers. A dividend at the rate of 4s. 2d. per share was declared.

The annual meeting of the Stonehaven Gas Company was held on Monday. The gross profit for the year had been £580, from which £169 had been deducted for depreciation. Out of the balance of £411, a dividend at the rate of 3s. per share—the same as for the past ten years—was declared. At the beginning of the year, the Directors reduced the price of gas by 5d. per 1000 cubic feet.

The Buckie Gas Company held their annual meeting on Saturday last, when it was reported that an expenditure of £200 in enlarging and reconstructing the retort-bench had been incurred. A dividend at the rate of 7½ per cent. was declared.

Mr. G. Baxter, the Water Engineer to the Corporation of Dundee, has prepared a report upon the subject of the extension of the area of supply, with special reference to the inclusion of the town of Arbroath in it. He states that the proposal he now makes is simply a resuscitation of a scheme which he prepared in 1893, with Arbroath added. He proposes to erect filter-beds and a service reservoir, to contain one million gallons of water, near the farm of Mains of Panmure. This reservoir would be of the same height as that at Stobsmuir, in Dundee, which it would balance; and thus the capacity of the mains lying in the lower zone to the east of Dundee would be practically doubled. He estimates the cost of the construction of the reservoir and connecting works at £5684, and of the mains to Arbroath at £9500. Several alternative schemes for the administration of the water supply are given, all of which work out at a cost which would entail a domestic rate in Arbroath of from 11¼d. to 1s. 3d. in the pound. Mr. Baxter's report is at present before the Water Committee.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 23.

Sulphate of Ammonia.

The market has again been somewhat irregular, but on the whole it has been quiet, and values have barely been maintained. In Scotland, where supplies are scarce, extreme prices have been reported, but elsewhere supplies have been sufficiently abundant. The closing quotations are £13 per ton f.o.b. Leith, £12 17s. 6d. per ton f.o.b. Liverpool, and £12 15s. per ton f.o.b. Hull. There has been good inquiry for delivery over the early autumn months; but the views of buyers have been substantially below the demands of makers, and any orders placed have been taken speculatively. Makers' quotations are £12 15s. per ton for July-September delivery, £12 12s. 6d. per ton for July-December, and £12 10s. per ton for October-March.

Nitrate of Soda.

This is quiet on spot at 9s. 4½d. and 9s. 7½d. per cwt., for ordinary and refined qualities respectively.

THE

MAXIM PATENT CARBURETTOR

FOR ENRICHING GAS IN BULK.

PREVENTS NAPHTHALENE DEPOSITS.

OVER **100** MAXIM PATENT CARBURETTORS HAVE NOW BEEN FIXED.

Among the Companies and Towns supplied are The Gas Light and Coke Company, The South Metropolitan Gas Company, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Southport, Alloa, Broughty Ferry, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past Seven Years.

MORE GAS & SALEABLE COKE PER TON of COAL CARBONIZED is PRODUCED; SAVING CAPITAL, LABOUR, FUEL, WEAR & TEAR, &c.

THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

Dealers in Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.

For Prices and full Particulars, apply to

THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,

18, DEVONSHIRE STREET, BISHOPSGATE, LONDON, E.C.

LONDON, *May* 23.

Tar Products.

There is nothing special to report. Pitch continues in about the same position; and the demand from South Wales is fairly good for both prompt and forward delivery. Continental buyers do not seem at present open to purchase. Some quantity of 90 per cent. benzol has been sold at 9d. f.o.b. London; while in 50-90 per cent. business is reported at 7d. delivered to consumers' works in England. Solvent and toluol remain in the same position. Prices are purely nominal, and there is no business doing. The demand for carbolic does not seem very strong at the moment. Probably consumers have secured all their supplies up to the end of June. There are still buyers at 1s. 7d. for July-December; but the makers decline to accept this price. In crystals, there is nothing fresh to advise. Creosote is decidedly easier. A considerable business has been done at 1¼d. in the North of England; while a large sale is reported to have been made at 1⅜d. f.o.b. London. The position of anthracene remains unchanged. There are still buyers over the next year of "A" quality, 40 per cent.; but manufacturers decline to quote for this period. The demand for crude naphthalene continues to be very good for September-December shipment; but as regards prompt, the article is entirely neglected.

The average values during the week were: Pitch, London, 57s.; east coast, 53s. 6d. to 54s.; west coast, 52s. 6d. to 53s. Benzol, 90 per cent., 8¼d. to 8¾d.; 50-90 per cent., 7d. to 7½d. Toluol, 7d. to 7½d. Crude naphtha, 3d.; solvent naphtha, 7d. to 8d.; heavy naphtha, 9d. Creosote, London, 1⅜d. to 1½d.; North, 1⅛d. to 1¼d. Heavy oils, 2d. to 2 1/16d. Carbolic acid, 60 per cent., 1s. 6¼d. to 1s. 6¾d. Naphthalene, 30s. to 45s.; salts, 21s. 6d. to 23s. 6d. Anthracene, "A" quality, 1⅜d. to 1⅞d.; "B" quality, 1d. nominal.

Sulphate of Ammonia.

The market has been decidedly quiet during the past week, and there has been almost an absence of business in all quarters. The value of Beckton may be taken as £12 15s. for June delivery, at which price it is reported that another large London Gas Company have actually done business. In Leith, makers report sales at £13 for prompt shipment; but only to a very limited extent. Probably about £12 17s. 6d. is about the actual value for June delivery. In Hull, there are sellers at £12s. 15s. for May-June; but consumers do not seem interested in this market just at present, and offer only £12 12s. 6d. In Liverpool, the market is very quiet, and there does not appear to be much business doing. Just at present there is an absence of business for May-June, and apparently there is not much chance that there will be any great demand before the holidays.

In view of the successful results achieved in the Gas Department of the Todmorden Corporation during the past financial year, the Gas Committee last Tuesday unanimously resolved, without solicitation, to make another substantial advance in the salary of Mr. H. Hawkins, the Gas Engineer.

COAL TRADE REPORTS.

London Gas Coal Contracts.

Following up the statement made last week with regard to the South Metropolitan Gas Company's coal contracts for the ensuing twelve months, the Newcastle correspondent of the "Financial Times" gives the following particulars regarding those of the Gaslight and Coke Company: "The two large London Gas Companies have now arranged for their supplies of gas coal over the ensuing year. The huge contract for supplying the London Gaslight and Coke Company usually follows that of the South Metropolitan Gas Company, whose conclusion I announced last week. In the meantime, the Gaslight and Coke Company have been busy in the market; and, I understand, have now completed their arrangements. In all, this Company consume about two million tons of gas coal per annum, and of this quantity have just booked over a million-and-three-quarter tons—the balance being represented by stocks which are reported to be in hand. This large quantity—the largest that comes into the North Country market—has been distributed over a number of collieries in various quantities, and at prices ranging, I understand, from 11s. 3d. to 12s. c.i.f. London, according to quality; the major portion, perhaps, being at 11s. 6d. The London Gaslight and Coke Company, unlike the South Metropolitan Company, buy their coals delivered at their wharves in the Thames; so that these prices include freight and discharge, which may be calculated at about 3s. a ton. Many of the contracting collieries employ their own steamers in fulfilling their contracts; but those who do not must, of course, charter tonnage to do so. It is estimated that such collieries will be readily able to do so at about 3s. a ton, if not in some instances at 2s. 10½d. to 2s. 11d. for large boats, which, indeed, are now said to be offering at about these figures. Deducting 3s. for freight, therefore, the c.i.f. prices above named range from 8s. 3d. to 9s. a ton f.o.b. Tyne or Wear, according to quality; the bulk of the contracts lying between these extreme figures. Reduced to f.o.b prices, the Gaslight and Coke Company have paid practically the same for their supplies this year as the south-side Company, and, in comparison with last year's rates, have effected a saving of round about 6d. a ton. The contracts in the case of both Companies have not been closed without very keen buying, and, it is said in the market here, a little friction in the course of the negotiations. It certainly appears to be the case that some well-known collieries, which have supplied these Companies almost uninterruptedly for a long period of years, have this year declined to accept the prices offered, and will not ship under the new contracts. As there is a good demand for gas coal, however, this is not a serious matter to the collieries concerned, except in those cases where they are owners of fleets of steamers which in past years have been almost regularly employed in carrying coals to the Gaslight and Coke Company, and must now seek employment in the open market, which, as everybody knows, is just now in a deplorable condition."

BRADDOCK'S New Patent GAS STATION GOVERNOR

Most Compact, Convenient, and Efficient.

Valves and other internal parts are accessible upon the removal of the Side Plate of the Valve-Chamber.

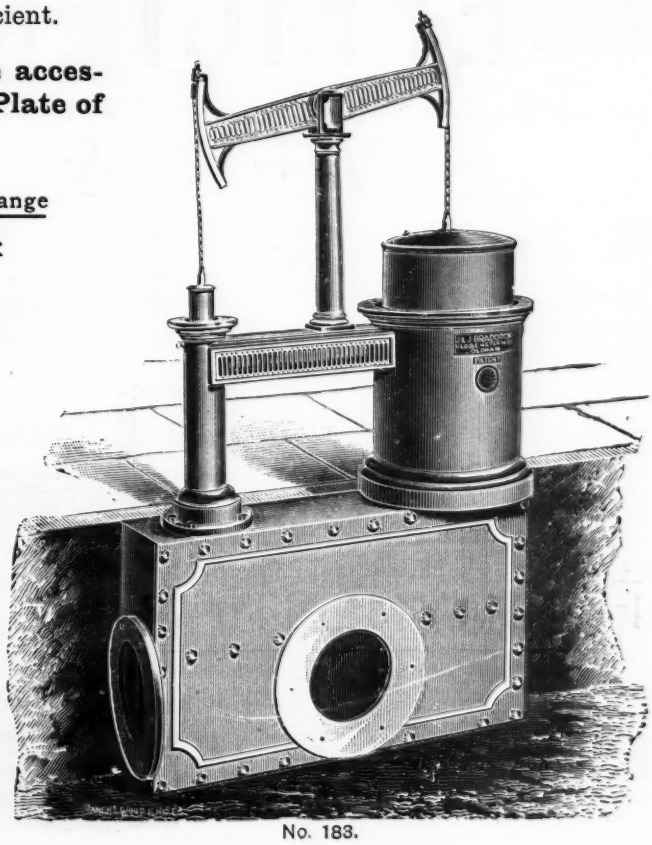
Occupies very little Space. The Flange diameter is about the greatest width.

THE BEST IN THE MARKET.

Over 80 (4 in. to 36 in. inclusive) in use.

The distance from the centre of Mains to the floor-level may be made to suit any requirements.

The Inlet and Outlet may be as Illustrated, or at opposite ends (or sides) of the Valve-Chamber.



No. 183.

J. & J. BRADDOCK

(Branch of Meters Limited),

Globe Meter Works, OLDHAM,

Telegrams: "BRADDOCK, OLDHAM." National Telephone No. 254.

And

45 & 47, Westminster Bridge Road, London, S.E.

Telegrams: "METRIQUE LONDON." Telephone No. 248 HOP.

Lancashire Coal Trade.

The general tendency of prices for all descriptions of fuel is in a weakening direction. The inability of the coalowners to obtain any reduction in wages under the Conciliation Boards, both in the Midlands and South Wales, may be taken as indicating that the Arbitrators, at any rate, who have had all the facts before them, are of opinion that prices have not yet got to that point which represents an unremunerative return to the collieries. Notwithstanding the reduction in house-fire coal prices with the commencement of the month, there is a very general feeling in the market that some further concession will become necessary, in view of the increasing keenness of competition from other coal mining centres. The demand is, of course, with the more summerlike weather, receding to limited proportions; and collieries are either going on short time or accumulating stocks. So far, there is no really quotable change upon house-fire coal prices, which in the Lancashire districts range from about 14s. up to 15s per ton at the pit for the very best qualities, 11s. 6d. to 12s. and 12s. 6d. for medium descriptions, such as second-class Arley and Pemberton four-feet, and about 10s. to 10s. 6d. and 11s. for the commoner sorts of round coal. The lower classes of round coal continue in moderate inland request for iron making, steam, and general manufacturing purposes. At the pit-mouth, ordinary descriptions can be bought readily from 8s. 3d. to 8s. 6d. per ton, and it is exceptional where more than 8s. 9d. is being got for the best quality. Shipping prices are still cut excessively low, which is also an indication that collieries have a good deal of surplus output that they are anxious to move away. Special lots can be bought at from 9s. 3d or even less, and general quotations scarcely average more than 9s. 6d. to 9s. 9d. per ton delivered at the Ports on the Mersey. As to gas coals, so far as any further business passing through gives an indication of the position, it only adds confirmation to what has previously been stated, that renewal contracts are being closed at about 3d. to 6d. per ton under last year's prices—a reduction of 6d. representing perhaps more nearly the general average. Engine classes of fuel continue to ease down, common slack being readily obtainable at from 4s. 3d. to 4s. 6d. per ton at the pit, with medium sorts about 5s. 3d. to 5s. 9d., and the best descriptions 6s. 6d. to 6s. 9d. up to 7s. in some special cases.

Northern Coal Trade.

The coal trade is steady, and the settlement of the contracts for the London gas coal supplies has given some feeling of rest to the market, which has been influenced for some weeks by conflicting rumours as to these. Best Northumbrian steam coals are 10s. 9d. per ton f.o.b., second-class steams 8s. 9d. to 9s. 3d., and steam smalls 5s. 6d. to 5s. 10½d. Steam coal collieries are now working fairly well. The gas coal trade has been a little excited by the large contracts that have been concluded. Looking to the low freights and the heavy quantities of coal, it may be said that these contracts are satisfactory on the whole, and that the prices may be put as from 8s. to 9s. per ton f.o b. for gas coals, according to quality. These decisions will influence the sales of occasional cargoes of gas coals, the prices for which may now be put as from 8s. 4½d. to 8s. 9d. per ton f.o.b., according to quality and time of sale. Some local contracts are also in the market, and will be determined in a week or two. The limited production of gas coke stiffens its price—about 12s. 3d. to 12s. 6d. per ton f.o.b. being the Tyne quotation. One or two of the inland towns, such as Darlington, have slightly raised the retail price of gas coke.

Scotch Coal Trade.

There cannot be said to be any change in the coal trade, which is not by any means vigorous, when the season of the year is taken into account. The export trade is that which appears to be languishing most. The prices quoted are: Main 8s. to 8s. 3d. per ton f.o.b. Glasgow, ell 8s. 9d. to 10s., and splint 9s. 3d. to 9s. 6d. The shipments for the week amounted to 227,415 tons—an increase of 12,986 tons upon the previous week, but a decrease of 3053 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,822,918 tons—an increase of 207,953 tons upon the same period of last year.

Southport Water Board.—At the meeting of the Southport, Birkdale, and West Lancashire Joint Water Board on Monday last week, a draft notice in respect to the purchase of land at Aughton, required for the construction of the new reservoir and approach thereto, from Sir Tristram Tempest, was approved.

London County Council and Gas Testing.—At the meeting of the London County Council on the 5th inst., the Parliamentary Committee presented a report on the subject of the Council's Bills in Parliament, gas testing, &c. (see *ante*, p. 309). No action was taken on the matter at the time; but at the meeting of the Council last Tuesday, the report was formally received.

Reductions in Price.—The Directors of the Monaghan Gas Company have decided to reduce the price of gas from 5s. 10d. to 5s. 5d. per 1000 cubic feet for general consumers, and to 5s. for cooking and motive power purposes; the new rates to run from the 1st inst. The Wigan Gas Committee have resolved that the price of gas for all purposes shall be reduced 2d. per 1000 cubic feet.

Southwold Gaslight Company, Limited.—This Company has been re-registered with a capital of £10,000, in £5 shares, under the Companies Acts, 1862 to 1900. It was originally constituted by Deed of Settlement dated May 15, 1848, pursuant to the Joint-Stock Companies Registration Act (7 & 8 Vict., cap. 110), with a capital of £1200, in £5 shares. It was re-registered under the Joint-Stock Companies Act, 1856, on Oct. 14, 1856, and the capital was increased to £1500; being subsequently augmented to £1900 in 1877 and to £2200, in £5 shares, in 1880, and remaining at that amount until the date of conversion into a limited Company, when all the shares had been taken up and paid for in full. At the same date, £700 was owing in respect of a loan from the bank.

"EFFICIENCY"—*i.e.*

SAWER & PURVES'

"Positive."

PREPAYMENT METER.

Gas and Water Profits at Carlisle.—There has during the last nine months been a profit of over £10,500 on the Carlisle Gas and Water Works. Of this, £6000 has been transferred to the general district rate, and £4500 will go to the city fund. Hitherto the two accounts have been made up to June 30; but under the new arrangement of last year, they are made up to March 25, the same as the other municipal accounts. If the full year had been taken into account, the transfer from the water profits might have been nearly £2000 more, and from the gas-works about £1000 more.

The profit realized by the Gas Department of the Smethwick Corporation in the past financial year amounts to £3490. The result is regarded as satisfactory, in view of the heavy burdens the undertaking has had to bear.

Messrs. F. C. Sugden and Co. have recently had orders placed with them for semi-deep regenerator settings by the Armagh Gas Company and the Cleckheaton Urban District Council, and for shallow regenerator settings by the Killarney Gas Lessees and the Audley Urban District Council. The order from Armagh is a repeat.

Messrs. Kirkham, Hulett, and Chandler, Limited, are erecting one of their improved patent "Standard" washer-scrubbers, with isolated bearings, at the South Metropolitan Gas Company's Bankside station. One of these machines has been recently shipped to the North Shore Gas Company, Sydney; and others are in hand for the Portsea Island Gas Company and the Haywards Heath Gas Company.

Messrs. Beck and Co., Limited, of Great Suffolk Street, Southwark, have sent us one of their new general catalogues. It is an artistic production, giving full particulars of the "Positive" water-meter and the valves, fittings, gas pipes and tools, pumps and pumping machinery, and other appliances, manufactured by the firm. The contents of the book occupy 274 pages, and the various articles (to which an index is furnished) are effectively shown in 700 illustrations.

According to the Central News, the Mond Gas Company of South Staffordshire have contracted with Messrs. Mephan, Ferguson, and Co., of Australia, for the supply of 13 miles of steel pipes, to constitute the Company's main. These pipes, which are constructed with a patent locking bar, instead of rivets, are in use in several of the Australian States; upwards of 400 miles in all being already laid, while more are in course of construction.

Letters of allotment for the recent issue of preference and ordinary shares in the Goring and Streatley District Gas and Water Company, Limited, have been posted; the prices obtained being £5 10s. and £5 12s. respectively.

The Bridges Committee of the London County Council have had under consideration the question of the maintenance and repair of the gas-lamps on the bridges and Embankment under their control, and have invited tenders therefor. Messrs. Pontifex and Co. have secured the contract for five years; the terms being £284 for the first, and £124 for each succeeding year. The total number of lamps to be kept in repair is 382. They have hitherto been looked after by a staff of four men specially employed for the purpose. At a recent meeting, the Council approved the action of the Committee in this matter.

Since Mr. T. E. Pye took the management of the gas-works of the Sandwich Corporation, he has been unceasing in his advocacy of gas as an economical illuminating and heating agent. In this work he has been ably assisted by Mrs. Pye. His latest device for popularizing gas is the holding of a cake competition for children and adults, in connection with a gas exhibition and an entertainment in the St. Peter's Parish Room. These meetings have been much appreciated, as they afford opportunities of disseminating information in a pleasant way.

Messrs. A. E. Podmore and Co., of 25a, Hatton Garden, E.C., have sent us a new list of their patent high-power recuperative incandescent self-intensifying gas-lamps, which are held in high repute by many gas engineers and public lighting authorities. The present list shows that the lamps are now made in several attractive forms for both single and cluster lighting. About the performance of this system we have spoken highly on former occasions; and, as to the new types of lanterns, it is clear that great care has been exercised over their design, construction, and finish. This applies equally to both the low and the high priced types.

New works for James Keith and Blackman Company, Limited, are nearing completion in the town of Arbroath. Offices in High Street frontage have been erected, with a show-room overhead. The foundry has been greatly enlarged, and will be used for the casting of apparatus for lighting, heating, and motive purposes. The works throughout are lighted by gas compressed by Keith's plant. Electric power is used for operating the cranes and other machinery. The extension of the works will enable the Company to double the number of men they employ in Arbroath. For further extensions, the Company have acquired a piece of ground stretching from Lordburn to Applegate.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

CLERK (Temporary). Ilford Gas Company.
FITTERS. Commercial Gas Company, Stepney.
MANAGER GAS FITTINGS, &c., COMPANY. No. 4030.
WORKING FOREMAN. No. 4038.

Situations Wanted.

ANALYST (Water and Trade Effluents). No. 4039.
CLERK, &c. No. 4033.
GAS MANAGER, &c. No. 4037
TRAVELLER GAS ENGINEERING FIRM. No. 4032.
WORKS CLERK. C. B, Watford, Herts.

Business for Disposal (By Auction).

GAS APPLIANCES COMPANY. London, May 28 and 29.

Plant, &c., for Sale.

PURIFIERS AND STATION GOVERNOR, &c. Walton Workhouse, Liverpool.
PURIFIERS. Leighton Buzzard Gas-Works.
SCRUBBER, WASHER, STATION METER, EXHAUSTER, TANKS, CONDENSERS, MOUTHPIECES, LANTERNS, &c. Longwood Gas Company.
STATION METER (60,000 feet). Halifax Gas Department.
VALVES, GOVERNOR, HYDRAULIC MAINS, &c. Hamilton Gas-Works.

Plant (Second-Hand) Wanted.

WASHER-SCRUBBER. Holywood Gas Company.

Sales of Stocks and Shares.

BARNET GAS AND WATER COMPANY. June 9.
BOURNEMOUTH GAS AND WATER COMPANY. June 9.
BRIGHTON AND HOVE GAS COMPANY. June 9.
CANTERBURY GAS AND WATER COMPANY. June 10.
FELIXSTOWE GAS COMPANY. June 6.
GAS METER COMPANY. June 9.
HASTINGS AND ST. LEONARDS GAS COMPANY. June 9.
LAMBETH WATER COMPANY. June 22.
SOUTH ESSEX WATER COMPANY. June 16.
TONBRIDGE GAS COMPANY. June 16.
WEST HAM GAS COMPANY. June 16.

TENDERS FOR

Ammoniacal Liquor (*See* "Tar").

Coal and Cannel.

ASHTON-IN-MAKERFIELD. Tenders by June 2.
BAKEWELL GAS DEPARTMENT. Tenders by June 2.
BOLTON GAS DEPARTMENT. Tenders by June 11.
BRIGHOUSE GAS DEPARTMENT. Tenders by May 30.
BUXTON GAS DEPARTMENT. Tenders by June 13.
CANTERBURY GAS AND WATER COMPANY. Tenders by May 30.
CARDIFF GAS COMPANY. Tenders by June 25.
CLITHEROE GAS DEPARTMENT. Tenders by May 30.
DONCASTER GAS DEPARTMENT. Tenders by June 12.
ELSECAR, &c, GAS COMPANY. Tenders by May 28.
EXMOUTH GAS COMPANY. Tenders by May 30.
FARNHAM GAS COMPANY. Tenders by June 6.
GLOUCESTER GAS COMPANY. Tenders by June 1.
HEBDEN BRIDGE. Tenders by June 6.
HEREFORD GAS DEPARTMENT. Tenders by May 30.
LAMBETH WATER COMPANY. Tenders by June 9.
OAKHAM GAS COMPANY. Tenders by June 5.
OLDHAM GAS DEPARTMENT. Tenders by June 2.
OXFORD GAS COMPANY. Tenders by June 6.
PAIGNTON GAS COMPANY. Tenders by June 6.
PENRITH GAS DEPARTMENT. Tenders by June 2.
PORTLAND GAS DEPARTMENT. Tenders by June 18.
SEAFORD GAS COMPANY. Tenders by June 9.
SEDGLEY GAS DEPARTMENT. Tenders by June 4.
SHREWSBURY GAS COMPANY. Tenders by June 13.
SKIPTON GAS DEPARTMENT. Tenders by May 27.
STOKE-ON-TRENT GAS DEPARTMENT. Tenders by June 10.
SWADLINCOTE GAS DEPARTMENT. Tenders by May 26.
TAUNTON GAS COMPANY. Tenders by June 1.
TENTERDEN GAS COMPANY. Tenders by June 13.
TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.
UXBRIDGE, &c., GAS COMPANY. Tenders by June 4.
WARRINGTON GAS DEPARTMENT. Tenders by May 29.
WIRKSWORTH GAS COMPANY. Tenders by June 5.
WOKINGHAM GAS DEPARTMENT. Tenders by May 26.

Fire-Clay Goods.

TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Gas Supply.

SANDHURST. Tenders by June 10.

General Stores, Lead, Lead Piping, Steam Pipes, Brass Cocks, &c.

ASHTON-IN-MAKERFIELD. Tenders by June 2.
TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Lanterns, Columns, and Cradles.

ASHTON-IN-MAKERFIELD. Tenders by June 2.

Lime.

TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Meters.

ASHTON-IN-MAKERFIELD. Tenders by June 2.

Pipes and Fittings, &c.

ASHTON-IN-MAKERFIELD. Tenders by June 2.
GREENOCK GAS DEPARTMENT. Tenders by June 4.
MAIDSTONE GAS COMPANY. Tenders by May 27.
TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Retorts.

TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Tar and Ammoniacal Liquor.

ABERDARE GAS COMPANY. Tenders by June 3.
ABERYSTWYTH GAS COMPANY. Tenders by June 4.
ASHTON-IN-MAKERFIELD. Tenders by June 2.
BAKEWELL GAS DEPARTMENT. Tenders by June 2.
BUXTON GAS-WORKS. Tenders by June 13.
SKIPTON GAS DEPARTMENT. Tenders by May 27.
STAFFORD GAS DEPARTMENT. Tenders by May 30.
SWADLINCOTE GAS DEPARTMENT. Tenders by May 26.
TYLDESLEY-WITH-SHAKERLEY. Tenders by June 2.

Washer-Scrubber, Tar-Extractor, &c,

GREENOCK GAS DEPARTMENT. Tenders by June 4.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

WHITSUNTIDE HOLIDAY.

In consequence of the WHITSUNTIDE HOLIDAY, Communications for the next issue of the "JOURNAL" and Orders respecting ADVERTISEMENTS should be received at the Office NOT LATER than THE FIRST POST ON SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 21s.; Half-Year, 10s. 6d.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, the charge is 25s. a year.
Abroad (in the Postal Union): £1 5s. 6d., payable in Advance.

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE has a larger annual sale than all other Oxides combined.

SPENT OXIDE purchased in any district.

GAS PURIFICATION & CHEMICAL CO., LD.,

JOHN WM. O'NEILL, Managing Director,

PALMERSTON HOUSE, LONDON, E.C.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.

Resists 4500° Fahr. Best for GAS-WORKS.

ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

BROTHERTON & CO., LIMITED.

Offices: Commercial Buildings, LEEDS. Correspondence invited.

SULPHATE OF AMMONIA

SATURATORS and LEAD WORK for Sulphate of Ammonia Plants.

For REPAIRS or ALTERATIONS, ring up "0848 BOLTON," or Telegraph "SATURATORS, BOLTON."

Largest Practice and most Up-to-Date Works in Britain.

JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.

GAS TAR wanted.

BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

IT is worth your while to buy direct. THE RELIANCE LUBRICATING OIL COMPANY 19 and 20, Water Lane, Great Tower Street, London, E.C., handle all kinds of Lubricating Oils, for Engines, Cylinders, Dynamos, Spindles, &c., Burning Oils, Solar Distillates, Carburetting Oils, and Spirits for Gas Making; Motor Oils, Fuel Oils, Animal, Fish, and Vegetable Oils, &c., for all purposes. Write for our "Trade Mark" Inkstand, sent free to customers. Non-customers, 2s. 6d. each. RELIANCE LUBRICATING OIL COMPANY, London, Glasgow, Newcastle-on-Tyne, &c. Established 1858. Telegraphic Address: "Subastral," London; A.B.C. Code used. Telephone No.: Avenue 5891.

NEW GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,

VICTORIA PAINT WORKS, MANCHESTER.

For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

SULPHURIC ACID for Sale.

BROTHERTON AND CO., LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PENNY-IN-THE-SLOT WORK.

H. GREENE & SONS, Ltd., are prepared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.

SURREY ENGINEERING WORKS, BLACKFRIARS ROAD, LONDON, S.E.

Telephone: 1693 HOP. Telegrams: "LUMINOSITY."

PATENTS AND TRADE MARKS

PUBLICATIONS. "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.

MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.

Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.

READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

AMMONIACAL LIQUOR wanted.

BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

NOW Ready. Price 6d.—"Analyses of BRITISH COALS AND COKE COLLECTED AND COMPARED." Part I.—Northumberland, Durham, and Yorkshire. (Reprinted from the Colliery Guardian.)

THE COLLIERY GUARDIAN CO., LTD., 49, Essex Street, Strand, LONDON, W.C.

THE EVESON COAL AND COKE COMPANY LIMITED, BIRMINGHAM,

ASK for Prices of Gas Coke in any quantities, delivered into waggons at Sellers' Station.

GAS-METERS wanted, old disused Wet. Copper Lamp Frames, Brass, Pewter, Tin, Zinc, Lead Ashes, Old Copper Electric Cable, &c., for Cash.

J. SMITH, Canal Road, BRADFORD.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

DUTCH OXIDE OF IRON.

THE First Dutch Bog Ore Co., Ltd. (Eerste Hollandsche Yzererts Maaty), ROTTERDAM.

General Manager for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.

London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.

General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

AMMONIACAL Liquor wanted by JOHN RILEY & SONS, Hapton, near ACCRINGTON.

WANTED, a Situation as Works' Clerk. Three Years at Local Gas Works. Shorthand and Book-keeping Good References.

Address C. B., 170, High Street, Watford, HERTS.

TRAVELLER is shortly Open to an ENGAGEMENT with a firm of Gas Engineers and Contractors. Extensive connection and can introduce good business.

Address No. 4032, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TRADE EFFLUENTS AND SANITATION.

ANALYST, experienced in Water Supply and Effluent Work, seeks APPOINTMENT in Sewerage Works, &c.

Address No. 4039, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SON of a Gas Manager, thoroughly experienced in Gas Manufacturing, also well trained in all branches of Electrical Engineering, would like a situation at home or abroad. Educated in three different Languages.

Address, No. 4037, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A GENTLEMAN (Age 30), with Twelve Years' experience in a leading Gaslight Company—Correspondence (Shorthand), Rentals, Stock-Ledgers, Transfers, Shares, Board Records, Dividends, &c., &c.—desires an APPOINTMENT in or about London. Highest Testimonials. Personal References Salary £100 per annum. One Month's Approbation.

Address No. 4033, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ILFORD GAS COMPANY.

WANTED, immediately, a temporary CLERK for General Office Work.

Applications, in writing, with two recent Testimonials, to be addressed to ALEX. A. JOHNSTON, Gas-Works, ILFORD.

COMMERCIAL GAS COMPANY.

WANTED, Experienced Fitters for Stoves and Fittings Department. Must have good References.

Applications to be addressed to the ENGINEER, Commercial Gas-Works, STEPNEY, E.

WANTED, a Gentlemanly Representative, thoroughly experienced in all branches of In and Out Door Gas Lighting, capable of taking ENTIRE CHARGE of the Business of an Old-Established House in London. Only First-class men need apply.

Apply, by letter, stating Salary required, Age, and Experience, to No. 4030, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Foreman for a Corporation Gas-Works. Present output about 16 million cubic feet, and rapidly increasing. Must have a thorough Practical Knowledge of Gas Making and Plant, be capable of taking ENTIRE CHARGE, and experienced in the working of Regenerative Furnaces.

Wages 30s. per week. Cottage, Coals, and Gas free.

App'y, stating previous experience, with *copies* of not more than Three Testimonials, to No. 4038, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C.

TAR Contracts Wanted on the Sliding-Sca'e or at Fixed Prices.

Managers and Secretaries desirous of selling to best advantage please communicate with DENT AND CO., Ouse Chemical Works, SELBY.

WASHER-SCRUBBER wanted, capable of dealing effectually with about 250,000 cubic feet of gas per day.

Send Particulars to the HOLYWOOD GAS COMPANY, LTD, Co. Down.

FOR SALE—Four Purifiers, 6 feet square, by 2 ft. 10 in., complete with 6-inch Connections, Dry Centre-Valve, Bearing-Bars, Wood Grids, and Lifting Screws for Covers. All in excellent condition, and ready for removal.

Also one 8-inch STATION GOVERNOR.

Apply, MASTER, Walton Workhouse, LIVERPOOL.

COAL GAS TAR wanted.

Gas Managers in Gloucester, Somerset, Worcester, Devon, Wilts, Hereford, Monmouth, and Glamorgan PLEASE NOTE. BEST PRICE offered, either on Fixed or Sliding-Scale Basis.

State Quantity to offer for Prompt and Forward Delivery.

The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

OXIDE OF IRON.

FIRE CEMENT, PAINT, GAS COAL.

BALE & CHURCH, 5, CROOKED LANE, LONDON, E.C

TO BE SOLD—Purifiers, Two or Four, 10 feet square by 4 ft. 6 in. deep, planed Joints, Connections, and Overhead Girders.

Write J. WRIGHT, 181, QUEEN VICTORIA STREET, E.C.

FOR SALE—Two Station Meters, capa-city 60,000 cubic feet per hour.

Full Particulars may be obtained from Mr Councillor WADSWORTH, Chairman of the Gas Committee, Gas-Works, HALIFAX.

FOR SALE—Four 12 feet square Purifiers, with 12-inch Connections, Centre-Valve, and Grids Complete, put on rail for £200.

For further Particulars, apply to C. F. RUGGLES, Gas-Works, LEIGHTON BUZZARD.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.

J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—Very good Gas Plant as under:—

PURIFIERS—Four 12 feet square, with 8-inch Centre-Valve and Connections. Planed Joints.

Kirkham WASHER-SCRUBBER, 300,000 cubic feet per diem, with Engine and 8-inch Valves and Connections.

Livesey WASHER, 250,000 cubic feet per diem, with 8-inch Valves and Connections.

Photos. sent on application to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

HAMILTON CORPORATION GAS-WORKS.

FOR SALE—A number of 10 inch, 12-inch, and 15-inch Rack and Pinion VALVES, and one 12-inch Foulis GOVERNOR complete; also three lengths of ⊃ shaped M. I. HYDRAULIC MAIN, with Dip Pipes and Flanged Stools for settings of four and two retorts. All recently removed owing to extensions.

Particulars from, and offers to,

J. BALLANTYNE,
Engineer and Manager.

GAS PLANT FOR SALE.

OWING to the acquirement of the Works of the Colne Vale Gas Company, and the closing down of these Works, the Longwood Gas Company have FOR SALE the following PLANT in good condition:—

One HOLMES' TOWER SCRUBBER, 5 ft. by 12 ft., mounted on Thurston's Square Tar-Extractor, 5 ft. 6 in. by 5 ft.
One HOLMES' WASHER, cylindrical, 16 ft. by 4 ft. 6 in., with Rope Driving Gear and Shaft.
One COWAN CYLINDRICAL STATION METER, measuring 6 ft. 6 in. by 6 ft., with 12-inch Connections; capacity 10,000 feet per hour.
One 5000 cubic feet per hour EXHAUSTER, with Accessories and Engine in duplicate.
One 500-light STATION METER.
One Wrought-Iron Cylindrical STORAGE TANK, 26 ft. by 7 ft.
One Cast-Iron STORAGE TANK, 6 ft. 6 in. by 5 ft. by 5 ft., with Cast-Iron Draw-Off Cock.
Six Cast-Iron CONDENSERS, each 9 ft. 6 in. high, and 2 ft. diameter, with square base, 17 ft. by 3 ft by 1 ft. 3 in., fitted with Cleaning-Out Lids for each Pipe.
The following MOUTH-PIECES, with Ascension and Dip Pipes to suit:—
28 OVALS, 18 in. by 14 in.
Seven OVALS, 18 in. by 15 in.
27 ⊃ 21 in. by 15 in.
Two Cast-Iron SLAKING TROUGHS, 4 ft. by 2 ft. 6 in. by 2 ft.
Also 100 Second-hand STREET LANTERNS.

Inspection invited.

Further Particulars on application to

J. H. BREARLEY,
Gas Engineer.

Longwood.

TAUNTON GASLIGHT AND COKE COMPANY.

THE Directors are prepared to receive TENDERS for the supply of COAL over One or Two Years from the 1st of July next.

Particulars may be obtained from the undersigned.

Sealed Tenders will be received up to the 1st of June next.

A. EDWARDS,
Secretary and Manager.

May 16, 1903.

BAKEWELL URBAN DISTRICT COUNCIL.

TENDERS are invited for the supply of GAS COAL—1200 to 1400 Tons—and 100 Tons of CANNEL, for one Year, ending the 30th of June, 1904, delivered at Bakewell Station (Midland).

Also for the Purchase of Surplus TAR and AMMONIACAL LIQUOR, delivered in purchaser's Tanks at Bakewell Station.

Forms of Tender and Particulars can be obtained from the undersigned, to whom Tenders must be sent by the 2nd of June.

The lowest or any Tender will not necessarily be accepted.

V. R. COCKERTON,
Clerk.

Bakewell.

SKIPTON URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

TAR.

THE Council invite Tenders for the purchase and removal of surplus TAR produced at the Skipton Gas-Works, between June 30, 1903, and July 1, 1904.

Probable quantity, 400 tons.

The Council reserve the right to let the Contract in one or more lots.

Further Particulars may be obtained from Mr. J. H. Woodward, Gas-Works, Skipton, to whom Tenders, endorsed "Tar," are to be sent before Wednesday, May 27, 1903.

RICHARD WILSON,
Clerk to the Council.

Skipton, May 15, 1903.

SKIPTON URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Council invite Tenders for the supply of about 6000 tons of Best Screened GAS COAL, to be delivered free at the Railway Station, Skipton, or at the Council's Siding adjoining the Gas-Works on the Leeds and Liverpool Canal, between June 30, 1903, and July 1, 1904, in monthly quantities.

No Form of Tender issued.

Further Particulars as to periods and quantities of deliveries, &c., may be obtained from the Manager, Mr. J. H. Woodward, Gas-Works, Skipton, and Tenders endorsed "Tender for Gas Coal," are to be sent to him on or before Wednesday, May 27, 1903.

The lowest or any Tender not necessarily accepted.

RICHARD WILSON,
Clerk to the Council.

May 15, 1903.

BUXTON URBAN DISTRICT COUNCIL.

TENDERS FOR TAR AND LIQUOR.

THE Gas Committee invite Tenders for the purchase of the surplus TAR and LIQUOR produced at their Works in Ashwood Dale, Buxton, for One Year commencing from the 30th of June next.

Forms of Tender and other Particulars may be obtained of Mr. H. Barker, Engineer, Town Hall, Buxton.

Sealed Tenders, endorsed "Tenders for Tar and Liquor," to be addressed to the Chairman of the Gas Committee, and delivered not later than Saturday, June 13.

The Committee do not bind themselves to accept the highest or any Tender.

By order,
JOSIAH TAYLOR,
Clerk.

BUXTON URBAN DISTRICT COUNCIL.

TENDERS FOR CANNEL.

THE Gas Committee invite Tenders for the supply of 3000 Tons of CANNEL, to be delivered at their Siding, on the Midland Railway, in Ashwood Dale, Buxton, during the Year ending the 30th of June, 1904.

Forms of Tender and other Particulars may be obtained of Mr. H. Barker, Engineer, Town Hall, Buxton.

Sealed Tenders, endorsed "Tenders for Cannel," to be addressed to the Chairman of the Gas Committee, and delivered not later than Saturday, June 13.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
JOSIAH TAYLOR,
Clerk.

ASHTON-IN-MAKERFIELD URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

TENDERS.

THE above-named Council invite TENDERS for the supply of the following materials between the 1st of July, 1903, and the 30th of June, 1904—viz.:

3000 Tons of GAS COAL or NUTS, screened.
Galvanized STEAM TUBING and FITTINGS.
Dry Ordinary METERS.
Dry Prepayment METERS.
Cast-Iron LAMP COLUMNS, CRADLES (Welded Joints), and Copper LANTERNS.
3-inch and 4-inch Socket and Spigot Cast-Iron PIPES and SPECIALS, coated.
Brass MAIN COCKS.

Also for the purchase of all surplus TAR and AMMONIACAL LIQUOR made at the Gas-Works between the dates before mentioned.

Further Information and Forms of Tender, may be had on application to Mr H. Niven, Engineer and Manager, Gas-Works.

Sealed Tenders, endorsed "Gas," to be delivered at the Clerk's Office, Council Offices, Ashton-in-Makerfield, not later than the 2nd of June, 1903.

The lowest or any Tender not necessarily accepted.

ALBERT SYKES,
Clerk to the Council.

Council Offices, Ashton-in-Makerfield,
May 15, 1903.

THE Institution OF Gas Engineers.

THE

ANNUAL GENERAL MEETING

WILL BE HELD ON

TUESDAY (10.30 a.m.), WEDNESDAY (10 a.m.), and THURSDAY (10 a.m.)

June 9th, 10th, and 11th,

AT THE

INSTITUTION OF MECHANICAL ENGINEERS,
STOREY'S GATE, ST. JAMES'S PARK, WESTMINSTER, S.W.,

By kind permission of the Council of that Society.

THE CHAIR WILL BE TAKEN BY THE PRESIDENT,

ANDREW DOUGALL, jun., Esq.,
OF TUNBRIDGE WELLS.

In connection with the Meeting, an EXCURSION to Eastbourne has been arranged for Friday, 12th June. Full Particulars are announced in the Programme.

THE BENEVOLENT FUND.

The Annual General Meeting of the Contributors to the Benevolent Fund will be held on Wednesday, 10th June, at 10 a.m.

WALTER T. DUNN, Secretary.

39, *Victoria Street, Westminster.*

FARNHAM GAS COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the supply of 3100 Tons of good, clean, fresh worked GAS COAL (screened and unscreened), delivered at Farnham Station (L. & S.W. Ry.) in such quantities and at such times as required during the Year ending May 31, 1904.

Forms of Tender may be obtained on application.

Tenders, endorsed "Coal," to be delivered to the undersigned not later than the 6th of June next.

S. J. SYMONDS,
Manager and Secretary.

Gas-Works, Farnham,
May 14, 1903.

BOROUGH OF BRIGHOUSE.

TENDERS FOR GAS COAL, SCREENED NUTS, CANNEL AND LIME.

THE Gas Committee are prepared to receive TENDERS for the supply and delivery of GAS COAL, SCREENED NUTS, CANNEL, and BUXTON LIME, required at the Mill Lane and Birds Royd Gas-Works during the Year ending June 30, 1904.

Specification and Form of Tender can be obtained on application at the Gas Engineer's Office, Mill Lane, Brighouse.

Sealed Tenders, stating price per ton delivered at the Gas-Works, or alongside the Gas-Works by the Calder and Hebble Canal, or at the Brighouse Railway Station, must be sent in on or before Saturday, the 30th day of May, 1903, addressed to the Town Clerk, Municipal Offices, Brighouse, endorsed on the outside "Tender for Coal" or "Lime" as the case may be.

The lowest or any Tender not necessarily accepted.

By order.
JAMES PARKINSON,
Town Clerk.

Town Clerk's Office, Brighouse,
May 14, 1903.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

THIS Council invite Tenders for the supply, at the Gas-Works, Tyldesley, from the 1st of July next to the 30th of June, 1904, of the undermentioned articles:—

GAS COAL and CANNEL.
Cast-Iron Spigot and Socket PIPES (Gas and Water).
LEAD TUBING (tinned), Gas and Water.
PIG LEAD.
Best Buxton LIME.
14 Oval Clay RETORTS, FIRE-BRICKS, FIRE-CLAY, &c.
Also for LABOUR for setting on Generator Principle.

Tenders are also invited for the purchase of the surplus TAR and AMMONIACAL LIQUOR to be produced at the Gas-Works during the Year ending the 30th of June, 1904.

Further Particulars and Forms of Tender may be obtained on application to Mr. Ginman, Engineer, Gas-Works, Tyldesley.

Sealed Tenders, on authorized forms only, endorsed "Tender for———," to be sent to the undersigned not later than Tuesday, the 2nd day of June, 1903.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
WM. J. MATTHEWS,
Clerk to the Council.

Council Offices, Tyldesley, Manchester,
May 14, 1903.

PAIGNTON GAS COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Paignton Gas Company are prepared to receive TENDERS for the supply of about 3600 tons (or such other quantity as may be agreed on) of best approved GAS COALS, to be delivered in such monthly quantities as may be required by the Company.

Tenders to state the price of the Coal delivered at Paignton Station, Great Western Railway, free of all charges.

The Directors do not bind themselves to accept the lowest or any Tender.

Further particulars may be obtained on application to Mr. C. G. Dawson, the Company's Manager.

Sealed Tenders, endorsed "Tender for Coal," specifying the description and quality of coal, to be sent on or before the 6th of June, addressed to the undersigned, Gas Offices, 1A, Victoria Street, Paignton.

F. W. PUDDICOMBE,
Secretary.

Paignton, May 19, 1903.

SWADLINCOTE DISTRICT URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

THE Gas Committee of the above Coun- cil are prepared to receive TENDERS for the surplus TAR and LIQUOR made at their works during the Twelve Months ending the 30th of June, 1904.

The Tar and Liquor will be loaded into the Contractor's Tanks at the Gas-Works.

Tenders, stating price per ton per degree Twaddle at 60° for Liquor, and at per ton for Tar.

Payments net cash monthly.

Further Information from G. B. Smedley, Engineer and Manager.

The Committee do not bind themselves to accept the highest Tender.

Sealed Tenders, endorsed "Tar" or "Liquor," to be sent in not later than Twelve noon, May 26, 1903, to

W. A. MUSSON,
Clerk to the Council.

Swadlincote, May 12, 1903.

SWADLINCOTE DISTRICT URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Council invite Tenders for the supply of 4500 Tons (more or less) of best screened GAS COAL, to be delivered in such quantities as may be required between the 30th of June, 1903, and the 30th of June, 1904.

All Particulars and Form of Tender may be obtained from Mr. G. B. Smedley, Engineer and Manager, on receipt of stamped addressed envelope.

Tenders, which must be on the prescribed Form and accompanied by analysis, must be delivered to me at my Office on or before the 26th of May, 1903, endorsed "Tender for Gas Coal."

The Council do not bind themselves to accept the lowest Tender.

W. A. MUSSON,
Clerk to the Council.

Council Offices, Swadlincote,
May 12, 1903.

MAIDSTONE GAS COMPANY.

TENDERS FOR CAST-IRON PIPES.

THE Directors of the Maidstone Gas Company invite TENDERS for the supply and delivery of the undermentioned Socket and Spigot CAST-IRON PIPES, coated:—

5000 yards of 6-inch diameter Pipes.
7000 yards of 4-inch diameter Pipes.

Approximate weight of each size to be given, and quotations at per ton; Specials at per ton.

Tenders to be sent in on or before Wednesday, the 27th day of May, 1903, addressed to the Chairman of the Maidstone Gas Company, endorsed "Tender for Pipes."

The Directors reserve the right to accept the whole or part of any Tender, and do not bind themselves to accept the lowest or any Tender.

Delivery of the Pipes to be completed within Three Months from the date of acceptance of Tender, in such quantities and at such dates as may be required.

By order,
H. SMYTHE,
Engineer and General Manager.

Gas-Works,
Maidstone,
May 11, 1903.

GLOUCESTER GASLIGHT COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the above Company invite TENDERS for the supply of about 33,000 Tons of GAS COAL for One Year from the 1st day of July next, in such monthly quantities as may be required by the Company.

Tenders to state the price delivered at the Midland Railway Sidings, Hempsted, near Gloucester, or the Great Western Railway Wharf, Llanthony, Gloucester; or if sent (as preferred) by Water, the price f.o.b., and also the price delivered at the Gas Company's Wharf on the Gloucester and Berkeley Canal.

Further Particulars and Forms of Tender may be obtained of the undersigned.

Sealed Tenders, endorsed "Tender for Coal," specifying the description and quality of the Coal, to be addressed to the Chairman, Gas Offices, Eastgate Street, Gloucester, and delivered not later than Monday, the 1st day of June next.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.

By order,
WILLIAM E. VINSON,
Secretary.

Gas Offices, Gloucester,
May 8, 1903.

THE Stafford Corporation Gas and Electricity Committee are prepared to receive TENDERS for the Surplus TAR to be produced at their Works from the 30th of June, 1903, for a period of One, Three, or Five Years.

Forms of Tender may be obtained from the undersigned.

The Committee do not bind themselves to accept the highest or any Tender.

Tenders, endorsed "Tenders for Tar," to be delivered at the Gas Offices not later than Five p.m. on Saturday, the 30th inst.

HUBERT POOLEY,
Engineer.

Stafford, May 21, 1903.

TENDERS FOR GAS COAL.

THE Corporation Gas Committee of Stoke-upon-Trent invite TENDERS for the supply of 12,000 Tons of GAS COAL.

Specification and Form of Tender may be obtained on application to the undersigned, or at the Gas Offices.

Tenders to be sent in not later than Twelve o'clock noon on the 10th day of June, 1903, addressed to F. Geen, Esq., J.P., Chairman of the Gas Committee, Stoke-upon-Trent, and endorsed "Tender for Gas Coal."

WM. PRINCE,
Engineer and Manager.

Gas Offices, Stoke-upon-Trent,
May, 1903.

ABERDARE, &c., GAS COMPANY.

TENDERS FOR TAR.

THE above Gas Company invite Tenders for the purchase of their Surplus TAR during the Twelve Months ending the 30th of June, 1904.

Sealed Tenders, endorsed "Tenders for Tar," to be addressed to the Chairman not later than the 3rd of June.

The highest or any Tender not necessarily accepted.

EVAN JONES,
General Manager and Secretary.

Gas-Works, Aberdare,
May 22, 1903.

ABERYSTWYTH GAS AND COKE COMPANY.

TENDERS FOR GAS TAR.

THE Directors of the above Company invite TENDERS for the purchase of the Surplus TAR produced at their Gas-Works during the Year ending the 30th of June, 1904.

The Tar will be loaded into the Contractor's Tanks at the Gas-Works.

Sealed Tenders, endorsed "Tender for Tar," to be addressed to the Chairman of the Company, Gas Office, Aberystwyth, not later than the 4th of June.

The Directors do not bind themselves to accept the lowest or any Tender.

By order,
R. J. JONES,
Secretary.

BOROUGH OF CLITHEROE.

(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas Committee invite Tenders for the supply of 3000 Tons of screened GAS COAL, 1000 Tons of SLACK, and 500 Tons of CANNEL, to be delivered on the Gas-Works Siding during the Year ending June 30, 1904.

Further Particulars and Forms of Tender may be obtained from the undersigned.

Sealed Tenders, endorsed "Tender for Gas Coal," addressed to the Chairman of the Gas Committee, to be delivered at my Office on or before Saturday, the 30th of May, 1903.

ROBT. BARRETT,
Manager.

Gas-Works, Clitheroe,
May 15, 1903.

COUNTY BOROUGH OF BOLTON.

(GAS DEPARTMENT.)

TENDERS FOR COAL.

THE Gas and Lighting Committee in- vite TENDERS for the supply of Screened and Unscreened GAS COAL, GAS SLACK, COBBLES, and NUTS required during the Year ending the 30th of June, 1904.

Specifications and Forms of Tender may be obtained on application to Mr. William Walch, Office Superintendent, Gas Offices, Bolton.

Sealed Tenders, endorsed "Tender for Coal," and addressed to the Chairman of the Committee, to be delivered at the Gas Offices, Bolton, not later than Thursday, the 11th of June, 1903.

R. G. HINNELL,
Town Clerk.

Town Hall, Bolton,
May 22, 1903.

HEBDEN BRIDGE AND MYTHOLMROYD GAS BOARD.

THE above Board are prepared to re- ceive TENDERS for 6000 Tons of GAS COAL and 1000 Tons of CANNEL, to be delivered free into the Gas Board's Sidings at Hebden Bridge, in quantities as the Board may require during the next Twelve Months.

Forms of Tender and any further Particulars may be had on application to E. J. Wellens, Engineer and Manager.

Tenders, endorsed, and addressed to James Simpson, Esq., Chairman, must be delivered by noon on Thursday, June 6, 1903.

The Committee do not bind themselves to accept the lowest or any Tender; and reserve to themselves the right to divide the quantity as required.

By order of the Board,
R. CRABTREE,
Clerk.

May 18, 1903.

COUNTY BOROUGH OF WARRINGTON.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 30,000 Tons of COAL, SLACK, or NUTS, and 5000 Tons of CANNEL.

Forms of Tender and all Particulars can be obtained on application to Mr. W. S. Haddock, Gas Engineer.

Sealed Tenders must be delivered by Ten a.m. on the 29th inst.

FREDK. TAYLOR,
Secretary.

Gas Offices, Warrington,
May 15, 1903.

OAKHAM GAS COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the supply of 1300 Tons of good Screened GAS COAL.

For Particulars and Forms of Tender, apply to the undersigned.

Tenders to be sent in on or before June 5.

Tenders to be endorsed and addressed to the Chairman of the Company.

The lowest or any Tender not necessarily accepted.

JAS. MASON,
Manager.

Gas Offices, Oakham,
May 23, 1903.

TENTERDEN GAS COMPANY.

COAL.

TENDERS are invited for the supply of 500 Tons, more or less, of best GAS COAL, at the following Stations, at such times and in such quantities as may be required: Appledore, Headcorn, and Robertsbridge (S.E. & C. Railway); also Rolvenden and Tenterden Town (Rother Valley Light Railway).

Tenders, with Analysis and full Particulars of the Coal offered, to be sent to me on or before Saturday, the 13th of June next.

The lowest or any Tender not necessarily accepted.

GEO. F. VARTY,
Secretary.

Tenterden, Kent,
May 25, 1903.

MANUFACTURE AND SUPPLY OF GAS AT SANDHURST.

THE Secretary of State for War is pre- pared to receive TENDERS for the Manufacture and Supply of Gas at Sandhurst, during a period of Six Years, from the 1st of August, 1903.

The existing Gas-Works at Sandhurst may be inspected, and printed Forms of Tender, and any further information obtained, on application to the Director of Supplies, Aldershot.

The Tenders are to be delivered at the Head Quarters Office, at Stanhope Lines, Aldershot, by Twelve o'clock noon, on Wednesday, the 10th day of June, 1903, addressed to the General Officer Commanding, 1st Army Corps.

Head Quarters Office,
Stanhope Lines, Aldershot,
May, 1903.

BOROUGH OF DONCASTER.

TENDERS FOR COAL.

THE Gas Committee of the Borough of Doncaster are prepared to receive TENDERS for the supply of 21,000 Tons of best screened GAS COAL during a period commencing July 1, 1903, and terminating June 30, 1904.

Particulars and Forms may be obtained on application to the undersigned.

Tenders should be sent, under seal, to the Chairman, endorsed "Tender for Coal," not later than Ten a.m. on Friday, June 12.

By order of the Gas Committee, who do not bind themselves to accept the lowest or any Tender.

ROBT. WATSON,
Engineer and Manager.

Gas-Works, Doncaster,
May 20, 1903.

PORTLAND URBAN DISTRICT COUNCIL.

(GAS DEPARTMENT.)

TENDERS FOR COAL.

THE Gas Committee of the above Council are prepared to receive TENDERS for the supply of from 3500 to 4000 Tons of GAS COAL required at their Works for the Year ending June 30, 1904.

Tenders to be sent, addressed to the Chairman at the Gas-Works, Portland, endorsed "Tender for Coal," not later than June 18, 1903.

Form of Tender and general Conditions of Contract will be supplied on application to the undersigned.

JNO. O. WHITAKER,
Engineer and Manager.

Gas-Works, Portland,
May 20, 1903.

GREENOCK CORPORATION.

(GAS DEPARTMENT.)

WASHER-SCRUBBER, TAR-EXTRACTOR, AND CONDENSING MAIN.

THE Gas Committee of the above Cor- poration are prepared to receive TENDERS for the supply and erection at Inchgreen Gas-Works of a WASHER-SCRUBBER and TAR-EXTRACTOR, having a capacity of 3 million cubic feet per 24 hours, and a 24-inch Steel CONDENSING MAIN, with all necessary Valves and Connections.

Specifications and Plans can be seen, and Tender Forms had, by applying to William Ewing, Engineer and Manager, Inchgreen Gas-Works.

Sealed Tenders, endorsed "Tender for Washer-Scrubber and Tar-Extractor" or "Condensing-Main," to be returned to Colin MacCulloch, Esq., Town Clerk, Greenock, not later than Ten a.m. on Thursday, the 4th of June, 1903.

Inchgreen Gas-Works, Greenock,
May 22, 1903.

CITY OF HEREFORD.

THE Gas Management Committee of the Corporation invite TENDERS for the supply of best screened large GAS COAL for One Year, from the 1st of August next, to be delivered free at the Gas-Works Siding, Hereford, in such quantities as may be required from time to time.

The estimated quantity required will be about 11,000 Tons.

Full Particulars and Printed Forms of Tender may be obtained on application to the undersigned.

Tenders, endorsed "Tender for Gas Coal," are to be sent in addressed to the Chairman, Gas Management Committee, Mansion House, Hereford, by Saturday, May 30.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
WILLIAM PARLBY,
Gas Engineer and Manager.

Gas-Works, Hereford,
May 14, 1903.

TO COAL MERCHANTS.

THE Directors of the Lambeth Water- Works Company are prepared to receive TENDERS for such quantities of Welsh and North Country COAL as they may require during Six or Twelve Months (at the option of the Company) commencing on the 1st of July next.

The Coal is to be delivered alongside the Company's Works at Molesey and Surbiton, and into their Stores at Brixton Hill, free of all charges in each case.

Conditions and Forms of Tender may be obtained at the Company's Office, Brixton Hill, and Tenders are to be delivered, under cover, endorsed "Tender for Coal," to the undersigned not later than Ten o'clock in the morning of Tuesday, the 9th day of June, 1903.

The Company do not bind themselves to accept the lowest or any Tender.

H. WILKINS,
Secretary.

Lambeth Water-Works,
Brixton Hill, London, S.W.
May 12, 1903.

EXMOUTH GAS COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Exmouth Gas Company invite TENDERS for 5000 Tons of Clean, Unscreened (through and through), First-Class Durham or any other good GAS COAL, to be shipped in such quantities (by sailing vessels only) and at such times as may be required, commencing from the 1st of July next.

Tenders to be accompanied by practical working analysis; and prices may be quoted c.i.f. or f.o.b at Exmouth Docks.

Sealed Tenders to be sent to the undersigned, addressed to the Chairman of the Company, and endorsed "Tender for Coal," not later than Saturday, the 30th day of May, 1903.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender (no special Form of Tender issued).

By order,
JAMES T. FOSTER,
Secretary and Manager.

Gas-Works, Exmouth,
May 9, 1903.

UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY.

GAS COAL.

THE Directors of the above Company invite TENDERS for the supply of about 6000 Tons of GAS COAL, deliveries of which are to commence in June, 1903, and finish the last week in May, 1904.

Tenders to be made out for the above quantity of the best description of screened or unscreened Gas Coal, either in whole or part, from, or divided between, the Durham, Yorkshire, or Derbyshire Pits, delivered by barge free alongside the Company's Works on the Grand Junction Canal, or by rail to Uxbridge Station, Great-Western Railway.

Tenders are to state the names of the Pits from which the above description of Coal will be supplied. Deliveries to be according to the instructions, and to the entire satisfaction, of the Company's Engineer.

Tenders to be received on or before June 4, addressed to the Chairman, Gas Offices, Belmont Road, Uxbridge, Middlesex, and endorsed "Tender for Coal."

W. M. GARDINER,
Secretary.

Uxbridge, Middlesex,
May, 1903.

CARDIFF GASLIGHT AND COKE COMPANY.

TENDERS FOR COALS.

THE Directors of the above Company are prepared to receive TENDERS for a supply of 80,000 Tons of Best Well-Screened Large GAS COALS, to be delivered between the 1st of July, 1903, and the 30th of June, 1904, in monthly quantities in accordance with the Specification.

Parties tendering may do so for the whole quantity or for quantities from 5000 tons upwards.

Forms of Tender and Specification of monthly deliveries may be obtained on application to the Engineer and Manager, Mr. H. Morley, M.Inst. C.E.

Sealed Tenders to be sent to the undersigned not later than Ten a.m. on Thursday, the 25th day of June next, addressed to the Chairman of the Company, endorsed "Tender for Coal."

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right to apportion the whole quantity as they may think fit.

By order,
GEORGE CLARRY,
Secretary.

Gas Offices, Cardiff,
May 16, 1903.

OXFORD GASLIGHT AND COKE COMPANY.

THE Directors invite Tenders for the Supply of about 33,000 Tons of Best Screened GAS COAL to be delivered to their Siding, G.W.R., during the Year ending June 30, 1904.

Tenders, addressed to the Chairman of the Oxford Gaslight and Coke Company, and endorsed "Tender for Coal," to be delivered by June 6, 1903.

By order,
JAMES ELDRIDGE,
Engineer and Manager.

COUNTY BOROUGH OF OLDHAM.

THE Oldham Corporation Gas-Works Committee are prepared to receive TENDERS for the supply of about 110,000 tons of COAL required by them during the Year ending the 30th of June, 1904.

Specifications and Forms of Tender can be obtained on application to Mr. Arthur Andrew, Gas and Water Offices, Oldham, to whom Tenders are to be sent on or before Tuesday, the 2nd of June, 1903.

A. NICHOLSON,
Town Clerk.

Oldham, May 16, 1903.

WIRKSWORTH GASLIGHT AND COKE COMPANY, LIMITED.

THE Directors of the above Company are prepared to receive TENDERS for the supply of about 900 Tons of screened GAS COAL from the 1st of July next.

Sealed Tenders will be received up to June 15.

S. HALSTEAD,
Secretary and Manager.

May 22, 1903.

SEAFORD GAS COMPANY.

THE Directors of the above Company invite TENDERS for the supply of 1000 Tons, more or less, of GAS COAL, to be delivered free at Seaford Station in quantities as required by the end of June, 1904.

Tenders, to be endorsed "Gas Coal," addressed to the Secretary, Seaford Gas Company, Sussex, on or before the 9th of June, 1903.

The lowest or any Tender not necessarily accepted.

No Forms.

Gas-Works, Seaford.

PENRITH URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Committee of the above Depart- ment invite TENDERS for the supply of COAL and CANNEL required during Twelve Months ending June 30, 1904.

Particulars and Form of Tender may be had on application to the undersigned.

Tenders, addressed to the Chairman of the Gas Committee, Penrith, and endorsed "Coal," must be delivered not later than June 2.

E. SHAUL,
Manager.

Gas-Works, Penrith,
May 21, 1903.

CANTERBURY GAS AND WATER COMPANY.

TENDERS FOR GAS COALS.

TENDERS are invited for the supply of 14,000 tons of the best GAS COALS, to be delivered during One Year commencing on the 1st of July next.

Forms of Tender, containing Particulars and Conditions of the Contract, may be obtained on application to the undersigned.

Sealed Tenders, endorsed "Coals," to be delivered at the Company's Offices, Castle Street, Canterbury, on or before Saturday, the 30th of May inst.

By order,
JAMES BURCH,
Secretary and General Manager.

May 11, 1903.

TO COAL CONTRACTORS AND OTHERS.

THE Sedgley Urban District Council in- vite TENDERS for supplying 750 to 1000 Tons of GAS COAL, the deliveries to be made at the Shut End Siding, at such times and in such quantities as may be directed.

It is desirable that a Statement of Analysis of the quality of a sample of the Coal to be supplied be sent with the Tender.

Sealed Tenders, marked "Coal," must reach me on or before the 4th of June, 1903.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
JOSEPH SMITH,
Clerk to the Council.

Offices: High Holborn,
Sedgley, May 15, 1903.

THE SHREWSBURY GASLIGHT COMPANY.

TENDERS FOR COAL.

THE Directors of the Shrewsbury Gas- light Company invite TENDERS for the supply of about 16,000 Tons of Screened GAS COAL, to be delivered free at the Great Western or London and North-Western Goods Yard, Shrewsbnry, during the Year commencing July 1, 1903, and ending June 30, 1904.

The Directors reserve to themselves the right to divide the quantity into two or more Contracts, and do not bind themselves to accept the lowest or any Tender.

Tenders must be made on Forms (containing further Particulars) which may be obtained on application at the Company's Works, or by post, and must be sent to the undersigned, on or before the 13th day of June, 1903.

By order,
WM. BELTON, Assoc.M.Inst.C.E.
Secretary and Manager.

Gas-Works, Shrewsbury,
May 13, 1903.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

HASTINGS AND ST. LEONARDS GAS COMPANY.

SALE BY AUCTION OF £10,000 NEW ADDITIONAL FIVE PER CENT. ORDINARY STOCK,

Ranking for Five per Cent. Dividend, subject to the Sliding-Scale, and entitled, in view of the dividends being paid on the Company's existing Stocks, to £6 1s. per Cent.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, London, E.C., on Tuesday, the 9th of June, at Two o'clock, by order of the Directors.

The Company was established in 1832, and supplies Gas in the favourite and rapidly-growing South-Coast Health and Pleasure Resorts of Hastings and St. Leonards, as well as the adjacent districts. The total authorized Capital is £770,000, of which £448,500 has been issued; the Sales of Gas have risen from 321 million cubic feet in 1893 to upwards of 433 millions last Year; there are nearly 10,000 Consumers; upwards of 6000 Gas-Stoves are in use; and, after paying the full Statutory Dividends to the 31st of December last, £43,373 was brought forward to the current Half Year as undivided profit, which is available for use as a Reserve Fund.

The New Capital is required to meet the continued increase in the Company's business. It will be issued free of Stamp-duty or other expense, and purchases can be made either by the Secretary of the Company or the Auctioneer (without charge) for Investors unable to attend the Auction.

Detailed Particulars of Sale, with Form of Instructions for the Secretary or Auctioneer to purchase, obtainable post free at the Company's General Offices in Queen's Road, Hastings, or of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS will Sell by AUCTION, at the Mart, Tokenhouse Yard, E.C., on Tuesday, June 9, at Two o'clock, in Lots, the following STOCKS and SHARES—

BRIGHTON AND HOVE GAS COMPANY,
£1120 ORIGINAL ORDINARY STOCK.

BARNET DISTRICT GAS AND WATER COMPANY,
£500 "C" STOCK, £100 "D" CAPITAL WATER STOCK, and ALLOTMENTS OF "D" CAPITAL WATER STOCK.

BOURNEMOUTH GAS AND WATER COMPANY,
40 £10 "B" SHARES.

GAS-METER COMPANY, LIMITED,
40 £10 ORDINARY SHARES.

Particulars may be obtained of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

WEST HAM GAS COMPANY.

NEW ISSUE OF £15,000 CONSOLIDATED ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

TONBRIDGE GAS COMPANY.

NEW ISSUE OF £5000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £5000 ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, June 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

FELIXSTOWE GASLIGHT COMPANY, LIMITED.

ISSUE of £3100 4 PER CENT. DEBENTURE STOCK.

THE Directors of the Felixstowe Gas- light Company, Limited, invite Applications for 31 FIRST MORTGAGE DEBENTURES of £100 each, bearing Interest at Four per Cent. per annum.

Applications should be accompanied by a deposit of 5 per cent. on the amount applied for, and delivered to the Secretary on or before Saturday, June 6, 1903. The balance of the purchase-money will be payable on notice of allotment.

Further Particulars on application to the Secretary.

F. PATERNOSTER,
Secretary.

Hamilton Road, Felixstowe.

TENDERS are invited by the Directors of the Elsecar, Wentworth, and Hoyland Gas Company for the supply of 3300 tons of Best Screened GAS COAL or NUTS, delivered at Elsecar G.C. Railway Station, for the Twelve Months ending the 30th of June, 1904.

Tenders to be addressed to Mr. WM. STENTON, Manager, Gas-Works, ELSECAR, near Barnsley, by the 28th inst.

BOROUGH OF WOKINGHAM.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for 1600 Tons of good, screened GAS COAL for the Year ending May, 1904.

Tenders, endorsed "Tender for Coal," addressed to the Chairman, to be sent in not later than the 26th inst.

A. G. BATES,
Manager.

Gas Offices, Wokingham.
May 16, 1903.

LAMBETH WATER-WORKS COMPANY.

NOTICE is Hereby Given, that it is the intention of the Company to SELL BY TENDER £100,000 Three per Cent. DEBENTURE STOCK, redeemable at par at the option of the Company on six months' notice at any time after the expiration of 25 years from the date of issue.

Particulars, Conditions of Sale, and Forms of Tender may be obtained at the Company's Office, Brixton Hill, S.W.

Sealed Tenders are to be delivered at the said Office not later than Twelve o'clock (noon) on Monday, the 22nd of June, 1903.

H. WILKINS,
Secretary.

Brixton Hill, S.W.
April 21, 1903.

CANTERBURY GAS AND WATER COMPANY.

SALE OF NEW "A" and "B" STOCKS,
IN THE
CANTERBURY GAS AND WATER COMPANY.

MR. FRANK AMOS is instructed by the Directors to SELL BY AUCTION, at the Mart, St. Margarets' Street, Canterbury, on Wednesday, June 10, 1903, at Three o'clock precisely,

£2000 NEW "A" and "B" STOCKS in the CANTERBURY GAS AND WATER COMPANY,

In 200 Lots of £10 each, authorized by the above-named Act.

Particulars and Conditions of Sale may be obtained of the Secretary, at the Offices of the Company, Castle Street, Canterbury; or of FRANK AMOS, F.S.I., 3, The Parade, CANTERBURY.

By order,
JAMES BURCH,
Secretary.

47, FARRINGDON ROAD, E.C.
SALE OF STOCK BY AUCTION.

THE GAS APPLIANCES COMPANY, LIMITED

THE LEASE OF THE ABOVE PREMISES WILL ALSO BE OFFERED.

ISON & HEWS have been Instructed by the Proprietors to SELL BY PUBLIC AUCTION, on Thursday, May 28, and Friday, May 29, the STOCK-IN-TRADE, Fixtures, Office Furniture, &c. Half Obscured Bulbs; a large quantity of Incandescent Globes, fancy, coloured, &c.; Incandescent Chimneys in cases; W. P. Steatite Burners (ordinary and bye-pass); W. P. Ordinary; large quantity of fancy etched cupid Globes, and fancy etched Shades; Brilliants Lamps with Pendants and Brackets complete; wrought-iron and copper Pendants; 3-Light brass Chandeliers, and 2 light ditto; 2-Light Harp Lamps with Shades; braided Tubing for gas stoves; lot of assorted Screens; 10-inch and 12-inch Cosmos Mica Chimneys K.K. assorted, 2 cases opal combination Globes, Shades, 5-inch and 6-inch clear domestics, assortment of Woodall's English Globes, 2-Light Harp Globes; 50 full Cases of Incandescent Globes, Bulbs, and Chimneys; Trade Fixtures, Office Furniture, Iron Safe.

The above stock is all fresh, recently purchased, and in good order, is deserving the special attention of the Trade, being good patterns and well assorted, and will be sold in convenient lots.

Catalogues are being prepared, and may be obtained at the above address free, or from the Auctioneers, Loughborough.

Sale will commence each day at Twelve o'clock prompt.

The Premises are held on Lease, are extensive, and at a very moderate rental.

If desired, the whole could be offered as a Going Concern. If not sold as a Going Concern, Lease will be offered separately.

On View two days prior, and mornings of Sale.

Now Ready, Price 10s. 6d., Green Cloth, Gilt Lettered.

VOL. LXXXI.
OF THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, &c.

Containing the Thirteen Numbers issued during the Three Months, January to March last, together with the Thirteen Plates referring to the New Granton Works of the Edinburgh and Leith Gas Commissioners, and many Photographic Illustrations.

GREEN CLOTH CASES for Binding the Quarterly Volumes of the "JOURNAL," Gilt Lettered, may be had, price 2s.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

Now Ready. Price 5s. 6d. Post Free.

REPORTS OF DISTRICT GAS ASSOCIATIONS FOR 1902.

The publication of these Volumes commenced in 1883, and most of them are still on sale.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

THE
PETROLEUM GAS SYNDICATE

Are prepared to erect Installations from 50 to 2000 Lights of their

Petrogene Patent Carburetting Plant

for the Manufacture of **Petroleum Air Gas**, for Gas Companies, Urban Councils, Gas Engineers, &c., on Sale, Hire, or Royalty. **Petroleum Air Gas is equivalent in cost of production to coal gas at about 1s. 6d. per 1000 cubic feet.** It may be used alone or in conjunction with coal gas, and is equally suitable for Lighting, Heating, or Power purposes. No Storage necessary.

For Particulars, apply to

C. E. MASTERMAN, Assoc.M.Inst.C.E.,
28, Victoria Street, Westminster, S.W.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on Application.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER,
Gas Engineers' Agents and Contractors for METERS, FIRE-CLAY GOODS, OXIDE OF IRON, AND ALL OTHER GAS APPARATUS.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

HEATHCOTE GAS COAL.
Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,
CHESTERFIELD.

NEWBATTLE CANNEL.
Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

COKE-BREAKERS
For Hand or Power. On Tooth-cutter or Jaw Principles.
Goodwin Barsby & Co., Engineers and Ironfounders, Leicester.

JOHN HALL & CO.,
STOURBRIDGE,
Manufacturers of
FIRE-BRICKS, LUMPS, TILES,
GAS RETORTS,
And every description of Fire-Clay Goods.
RETORTS CAREFULLY PACKED FOR SHIPMENT.

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

JAMES MILNE & SON, LTD.,
GAS ENGINEERS
MILTON HOUSE WORKS EDINBURGH.
LONDON. —— LEEDS. —— GLASGOW.

Gibbons Brothers, Ltd.

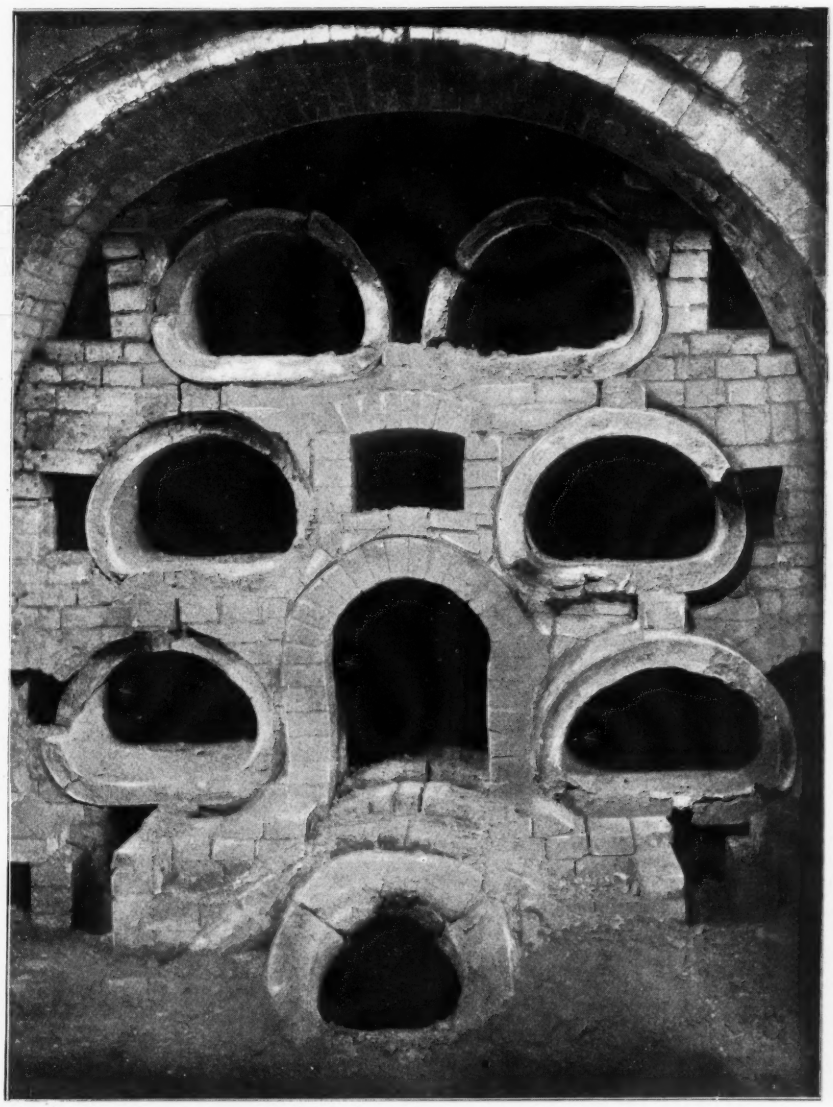
Dibdale Works, Nr. Dudley.

Telegraphic Address:—
"GIBBONS, LOWER GORNAL."

Telephone No. 10A
DUDLEY EXCHANGE.

PHOTOGRAPH OF OUR **HORIZONTAL** SETTING.

AFTER OVER *1,300* DAYS' WORK.



GIBBONS & MASTERS'
PATENT REGENERATIVE SETTINGS.

(PATENT No. 16,526.)

Printed for Walter King by King, Sell, & Olding, Ltd.; and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, May 26, 1903.

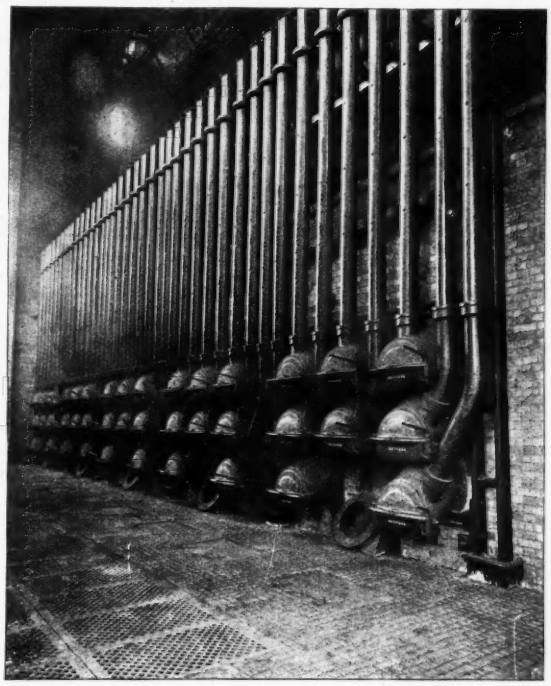
INCLINED RETORTS.

WE

make every single part of the Installation in our own Works at

RETFORD,

Including the Roofs, Coal Tippers, Coal Breakers, Coal Elevators, Coal Conveyors, Hot Coke Conveyors and Screening Plants, Retort Mouthpieces with Self-Sealing Lids, Stage Floors, Foul and Hydraulic Mains, Ascension, Arch, and Dip Pipes, &c., &c.



WE

only buy the Bricks and Raw Material. So under these conditions we have gained a

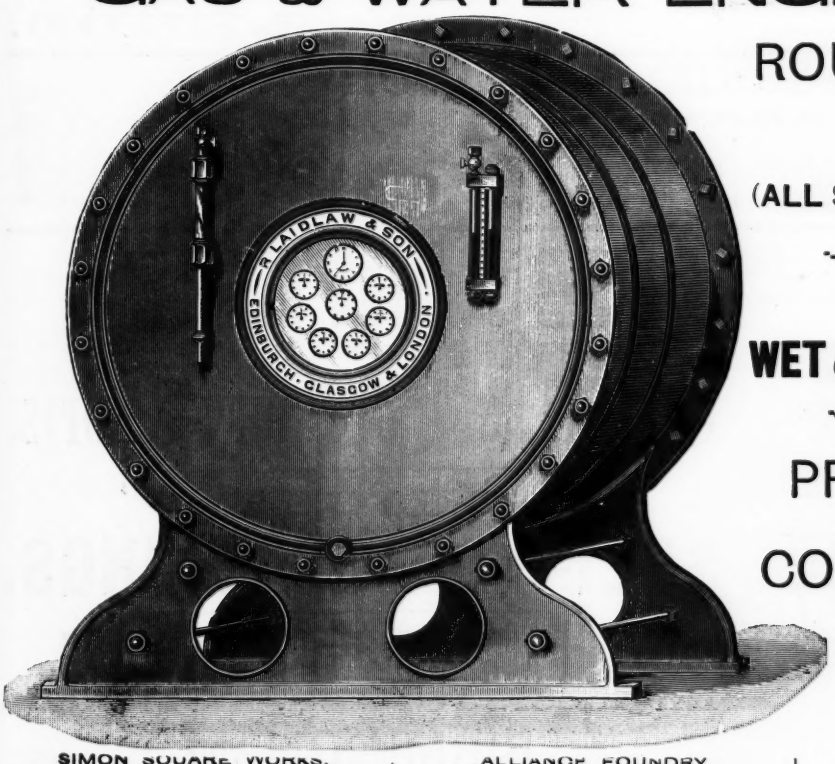
REPUTATION

for nothing but the Highest Class of Work, as can be seen in our Illustrations at Smethwick, Leek, Liverpool, Malvern, Shipley, &c., &c.

W. J. JENKINS & CO., Ltd., RETFORD.

R. LAIDLAW & SON, LIMITED,

GAS & WATER ENGINEERS.



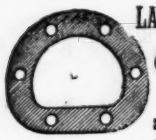
ROUND OR SQUARE STATION (ALL SIZES) METERS.

CONSUMERS'

WET & DRY GAS-METERS.

PREPAYMENT AND COMPENSATING METERS.

SIMON SQUARE WORKS, **EDINBURGH.** | ALLIANCE FOUNDRY, **GLASGOW.** | 6, LITTLE BUSH LANE, **LONDON, E.C.**



LARGEST MANUFACTURERS in the UNITED KINGDOM of GAS-RETORTS,

Horizontal or Inclined; also Makers of Segmental Retorts of all Sections.

PATENTEES OF

Machine-Flanged RETORTS.

DIBDALE WORKS, DUDLEY.

B. GIBBONS, JR., LD.

TELEPHONE DUDLEY NO. 10.

"ABC" Code and UNICODE used for Telegrams and Cablegrams.

Telegraphic Address: "MACHINE, LOWER GORNAL."

SPECIAL BRICKS & BLOCKS of every description for GENERATOR and REGENERATOR FURNACES.

Large Stocks of Bricks of all sizes, Burrs, Boiler Seating Blocks and Covers, Plain and Rebated Tiles, &c., &c.

Retorts and other Fire-Clay Goods carefully packed for export.

FOREIGN AND HOME COPIES OF ILLUSTRATED CATALOGUES ON APPLICATION.

JOSEPH CLIFF & SONS

INCORPORATED IN THE LEEDS FIRE-CLAY COMPANY, Ltd.,

Wortley, LEEDS.

LONDON OFFICES & DEPÔTS:

Baltic Wharf, Waterloo Bridge, S.E.

and G.N. Goods Yard, King's Cross, N.

Liverpool: Leeds Street.

Leeds: Queen Street.

Machine-Made Retorts

Have been made in large quantities for the last twenty years; and during the whole of that time have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

Retorts carefully Packed for Export.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

F. C. SUGDEN & Co.

CARBONIZING SPECIALISTS.

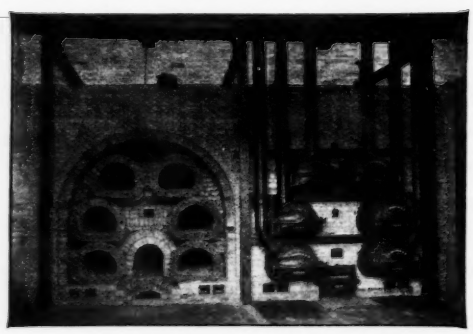


PHOTO. OF REGENERATOR SETTINGS DURING CONSTRUCTION.

REGENERATOR & GENERATOR SETTINGS

DEEP, SEMI-DEEP, AND SHALLOW.

Maximum Make per Ton and Mouthpiece.

Minimum Fuel Consumption.

NUMEROUS REPEAT ORDERS

Have been received for each of the above types of settings.

RESULTS GUARANTEED. RETORTS RESET.

SOLE MAKERS OF CRIPPS' PATENT CHIMNEY.

Designs and Estimates on application. 28, EAST PARADE, LEEDS.

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.

GLAZED BRICKS AND PORCELAIN BATHS.

Over 400 recently Supplied to the Corporation Gas Department, Saltley Birmingham.

Telegraphic Address: "Motive, Birmingham."

MOUTHPIECES FOR Inclined and Ordinary Retorts.

GRICE'S SPECIAL FASTENINGS.

WILLIAM GRICE & SONS, Ltd.,

Engineers & Gas-Engine Makers,

BIRMINGHAM.

London Office: 25, Victoria St., Westminster. Mr. A. B. Coote, Representative.

BIGGS, WALL, & Co.

13, CROSS STREET, FINSBURY PAVEMENT, LONDON, E.C.

Telegrams: "RAGOUT, LONDON." Telephone 273 CENTRAL.

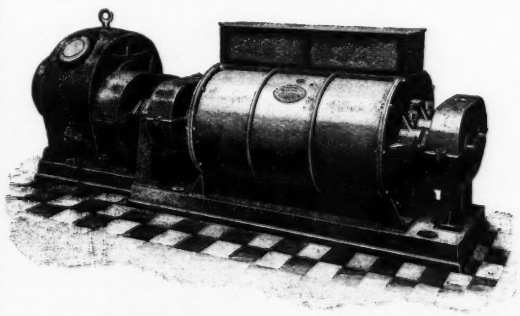
METHANE-HYDROGEN WATER-GAS PLANT.

3 gallons Tar and 20 lbs. Coke produce 1000 cubic feet 10 to 12 Candle Power Gas of the following composition—

Hydrogen	64·4 per cent.
Methane	12·0 „ „
Unsaturated Hydrocarbons	3·0 „ „
Carbon Monoxide	15·0 „ „
Nitrogen and Carbon Dioxide	5·6 „ „
	100·0
Calorific Value	400 B.T.U.

See **Prof. VIVIAN B. LEWES'S** Lecture before Society of Arts, reported in the "JOURNAL OF GAS LIGHTING," Dec. 9, 1902.

THWAITES BROS., LD.,



MECHANICAL ENGINEERS,

BRADFORD.

ROOTS' BLOWERS

IN ALL SIZES TO DELIVER UP TO

25,000 cubic feet of Air per minute.

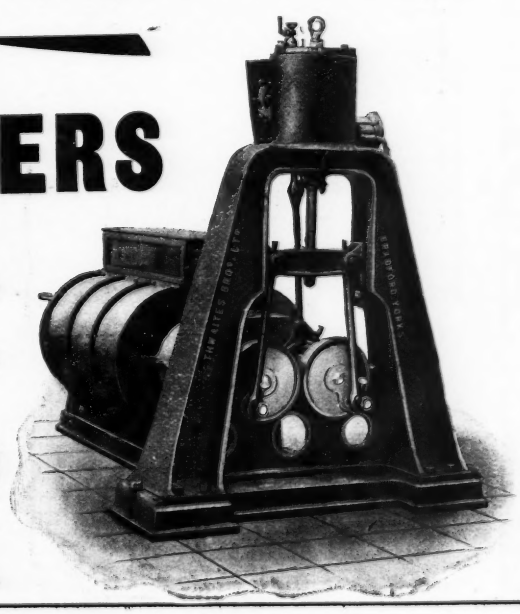
Driven by Engine, Belt, or Motor.

SPECIALLY DESIGNED AND OF

MODERN CONSTRUCTION

. . For all Processes of . .

GAS MANUFACTURE.



W. C. HOLMES & CO., LONDON & HUDDERSFIELD.

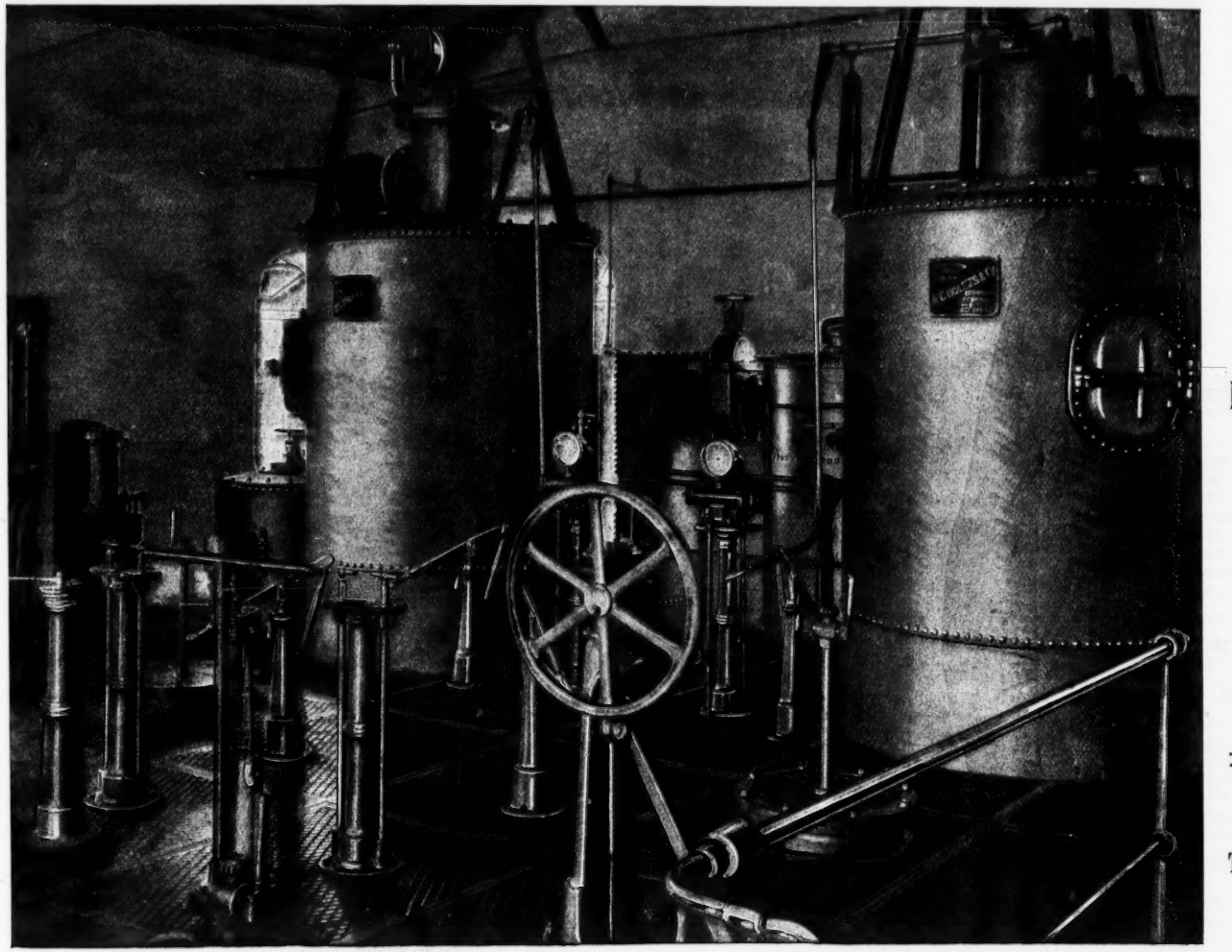
SOLE MANUFACTURERS OF

Patent "NEW" Scrubber-Washer.

"Western" P. & A. Condensers.

Double Faced Valves.

Mouthpieces with Automatic Catch.



Operating Floor of
IMPROVED "LOWE" CARBURETTED WATER-GAS PLANT
Erected at LONDONDERRY.

Purifiers.

Condensers.

Gasholders.

Retorts and Retort Ironwork.

Roofs.

Bridges.

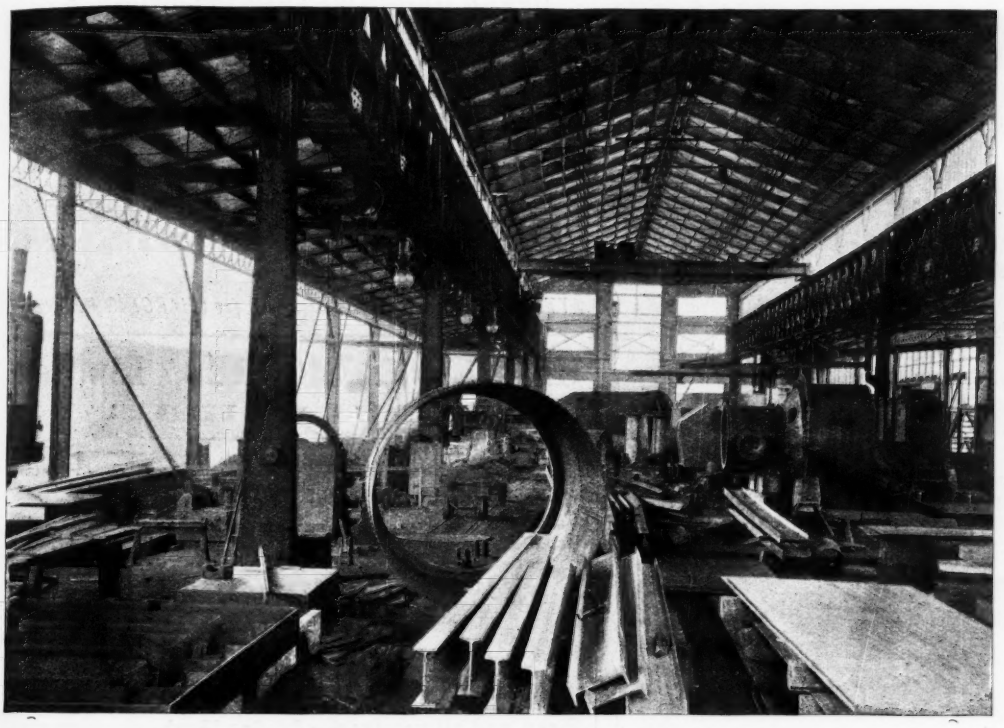
Girders.

Telegrams:
"HOLMES, HUDDERSFIELD."
"IGNITOR, LONDON."

Works:
TURNBRIDGE, HUDDERSFIELD.

London Office:
WESTMINSTER CHAMBERS,
11, VICTORIA STREET.

GASHOLDERS



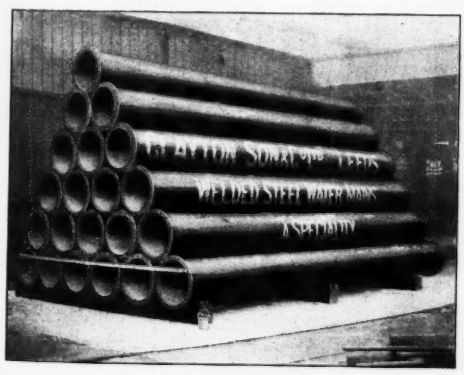
Part View of One of our Construction Shops. (*From a Photo.*)

AND

GAS PLANT

OF EVERY KIND MADE UNDER COVER.

ASHMORE, BENSON, PEASE, & CO., LD., Telegrams: "GASHOLDER." **STOCKTON-ON-TEES.**



WELDED OR RIVETED STEEL PIPES

A SPECIALITY

FOR ALL PURPOSES, TO STAND ANY PRESSURE AND PASS ANY INSPECTION.

CONTRACTS UNDERTAKEN FOR ANY LENGTH OF

PIPE LINE For Water, Steam, Oil, Hydraulic, or Pneumatic Pressure; also for Gas or Air. Any diameter from eight inches upwards.

COMPLETE GAS PLANTS.

CLAYTON SON & Co. LTD LEEDS.

ALSO MAKERS OF

STEEL STORAGE TANKS.

Structural Iron & Steel Work,

HIGH-CLASS BOILERS,

For High Pressures, fitted with DEIGHTON'S PATENT CORRUGATED FLUES, giving increased heating surface and highest economy in working.

ON ADMIRALTY AND WAR OFFICE LISTS.

MOBBERLEY & PERRY,

GAS RETORT, FIRECLAY, AND BRICK WORKS,

STOURBRIDGE.

MANUFACTURE EVERY KIND OF FIRECLAY GOODS,

Inclined, Horizontal, and Segmental Retorts of Best Quality.

LARGE STOCKS KEPT.

Now Ready - 392 Pages.

WATER-WORKS DIRECTORY and STATISTICS . . . 1903.

Price 10s. 6d. nett.

Thoroughly revised and brought up to date from returns, the forms of which were prepared by the British Association of Water-Works Engineers. The Association has also rendered valuable assistance in the collection and compilation of the particulars now published, and the new volume will be found to **contain a great deal of information of a technical nature which has never before been published in a comprehensive form.**

Specimen Page free.

London:
HAZELL,
WATSON, &
VINEY, Ltd., 52, Long Acre.

PODMORE & THOMAS'

PATENT

LOW-PRESSURE HIGH-POWER RECUPERATIVE INCANDESCENT GAS LIGHTING SYSTEM.

DUST & INSECT PROOF.

The highest efficiency yet obtained from Low Pressure Incandescent Gas Lighting without mechanical aid.

Made in suitable sizes and any design to enable Lighting Authorities to successfully compete with Electric Light. Also made as Ventilating Lights.

A. E. PODMORE & CO.,

25a, HATTON GARDEN, E.C.

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON S.E.

SUPPLY FROM STOCK

CAST-IRON RETORTS

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

FLANGE PIPES FOR STEAM.

Sole Manufacturers of **LYON'S "PATENT" GAS-MAIN SYPHONS.**

AGENTS FOR

ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

HARPER & MOORES, Limited, STOURBRIDGE.

MANUFACTURERS OF

Inclined, Horizontal, and Segmental

GAS-RETORTS,

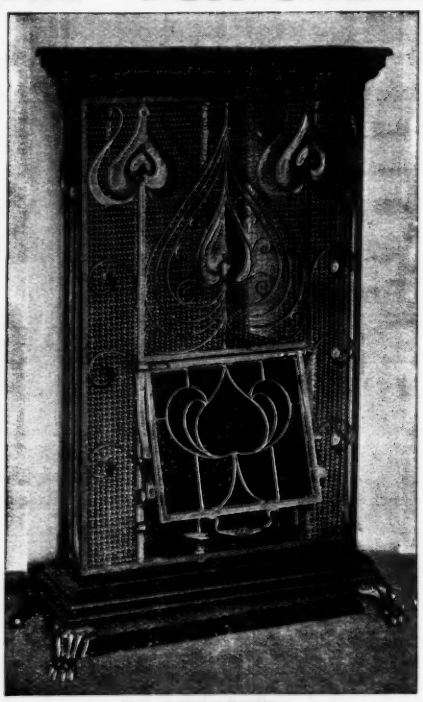
Fire-Bricks, Fire-Clay Lumps, and Tiles

OF EVERY DESCRIPTION.

Also Manufacturers of **Cast-Iron Retorts, Iron Mouthpieces, Pipes, and all necessaries for Gas-Works requirements.**

Telegraphic Address: "MOORES, LYE. Telephone No. 23 Lye.

THE "LUX-CALOR" TRADE MARK.



CS LUX-CALOR.

RITCHIE'S PATENT

The "Lux Calors" were the first

CONDENSING STOVES

on the Market and, after Twenty-Five Years' experience, are still first.

Full Particulars and Prices from

RITCHIE & CO.

Contractors for Automatic Supplies to the Gaslight and Coke Company and the South Metropolitan Gas Company.

46, Hatfield Street, Southwark, LONDON, S.E.

Telegrams: "WARMNESS, LONDON." *Telephone:* 1588 HOP.

BOWENS' Ltd. Successors,
STOURBRIDGE.

MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
ESTABLISHED 1860.

CLAYTON SON & Co Ltd LEEDS
MAKERS OF THE **LARGEST GASHOLDER** IN THE **WORLD** ALSO
THE ORIGINAL MAKERS OF
SPIRAL GUIDED GASHOLDERS
MAKERS OF ALL KINDS OF
STRUCTURAL IRON & STEEL WORK. STEEL FRAMED BUILDINGS
ROOFS RETORT FITTINGS
PURIFIERS RETORT LIDS
ANTIFREEZERS for Gasholders
STEEL TANKS
OF ALL SIZES
MAKERS OF THE LARGEST IN THE WORLD.
GASHOLDERS
OF EVERY DESCRIPTION & SIZE.
HIGH CLASS BOILERS FITTED WITH DEIGHTON'S PATENT CORRUGATED FLUES.
Telegrams "GAS LEEDS." London Office 60 Queen Victoria St E.C.

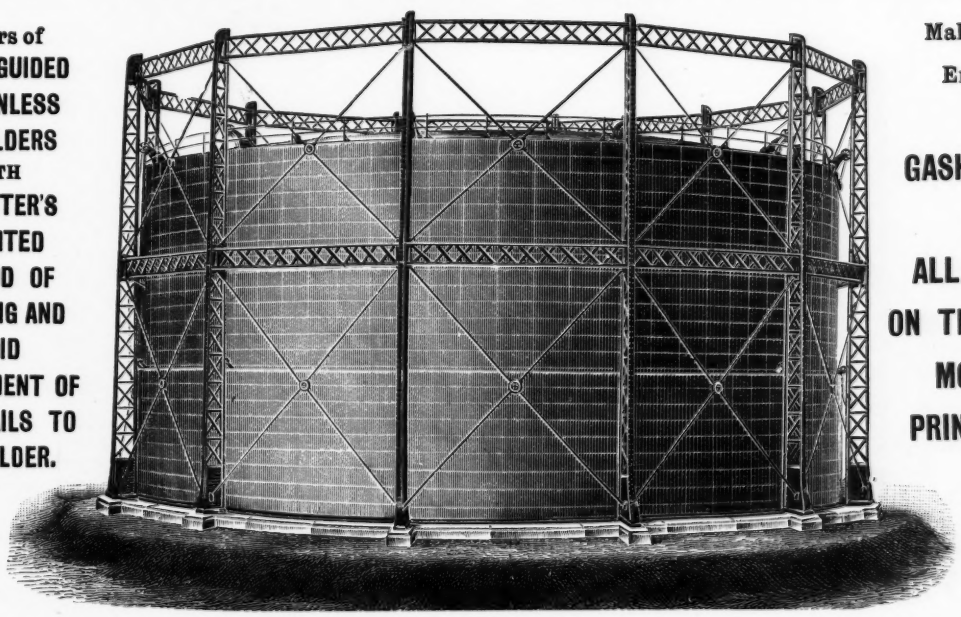
MANNESMANN

LAMP POSTS
made throughout of
WELDLESS STEEL TUBING
including base, ring, and ladder rest.
Light, Strong, Unbreakable, and Cheap.
GAS, WATER, & STEAM TUBES AND FITTINGS.
WELDLESS STEEL SPIGOT & FAUCET PIPES
for Gas and Water Mains.
Tubes can be supplied up to 10 inches diameter and in lengths up to 30 feet.
THE BRITISH MANNESMANN TUBE COMPANY, LTD.,
Landore, South Wales.
Birmingham Depôt: 110, COLMORE ROW.
London Office: 110, CANNON STREET, E.C.

R. & J. DEMPSTER, LTD.. GAS PLANT WORKS,
OLDHAM ROAD, MANCHESTER.

Telegraphic Address "SCRUBBER, MANCHESTER." National Telephone Nos. 54 and 2296.

Makers of SPIRAL-GUIDED COLUMNLESS GASHOLDERS WITH DEMPSTER'S PATENTED METHOD OF SHEETING AND RIGID ATTACHMENT OF GUIDE-RAILS TO GASHOLDER.



Makers and Erectors of GASHOLDERS OF ALL SIZES, ON THE MOST MODERN PRINCIPLES.

London Office: 165, GRESHAM HOUSE, OLD BROAD STREET, E.C.

PARKINSON'S

STATION METERS.

ALL SIZES

UP TO 300,000 PER HOUR.

PARKINSON AND W. & B. COWAN, LTD.
(*Parkinson Branch*),

COTTAGE LANE, CITY ROAD, LONDON.

BELL BARN ROAD, BIRMINGHAM.

[See also Advt. p. 500.

Printed for WALTER KING by King, Sell, & Olding, Ltd.; and published by him at 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, May 26, 1903.